# Arizona Vaccine Preventable Disease Update

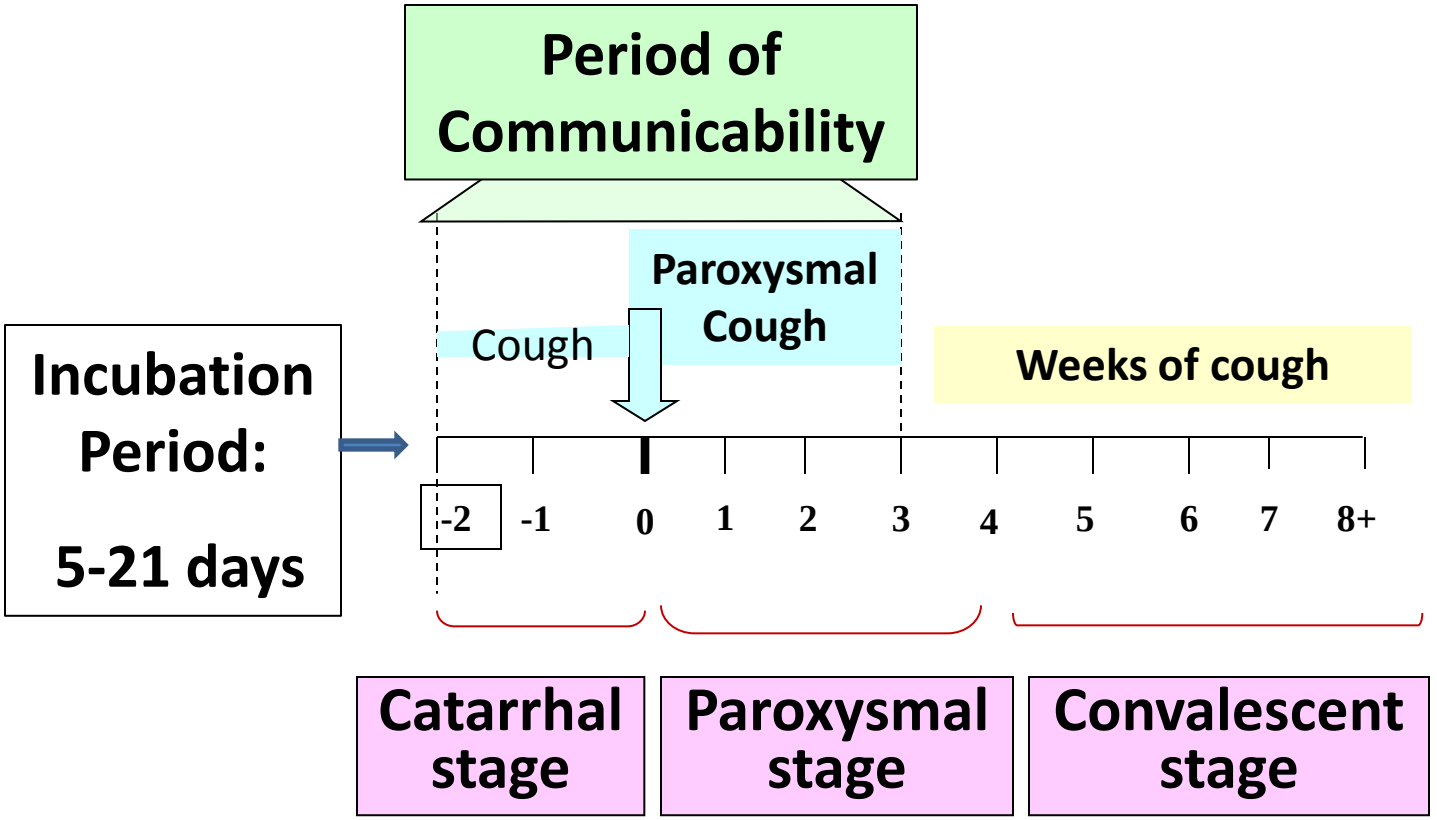
Karman Tam, MPH and Susan Goodykoontz
Arizona Department of Health Services
Office of Infectious Disease Services

# Selected Reportable Vaccine Preventable Diseases in Arizona

- Pertussis
- *Neisseria meningitidis*
- *Haemophilus influenzae*, type B
- Mumps
- Measles
- Hepatitis B
- Influenza

# Pertussis

# Clinical Course of Pertussis



# Pertussis Epidemiologic Features

- Highly contagious, respiratory transmission
- Secondary transmission is common, secondary attack rates up to 80% among susceptible household contacts
- Patient is most infectious during catarrhal period and the first two weeks after cough onset
- Incubation period: typically 5-21 days, can be up to 42 days
- Communicability: 21 days

# Typical physical examination in patient with pertussis…when not coughing

- Not ill appearing
- No fever
- Normal respiratory rate
- Little or no runny nose
- Lungs often clear

# Unlikely to be Pertussis

- Fever
- Ill in between coughing
- Lots of nasal congestion
- Cough gets better over time
- Purulent secretions
- Cold symptoms but no known contact with pertussis

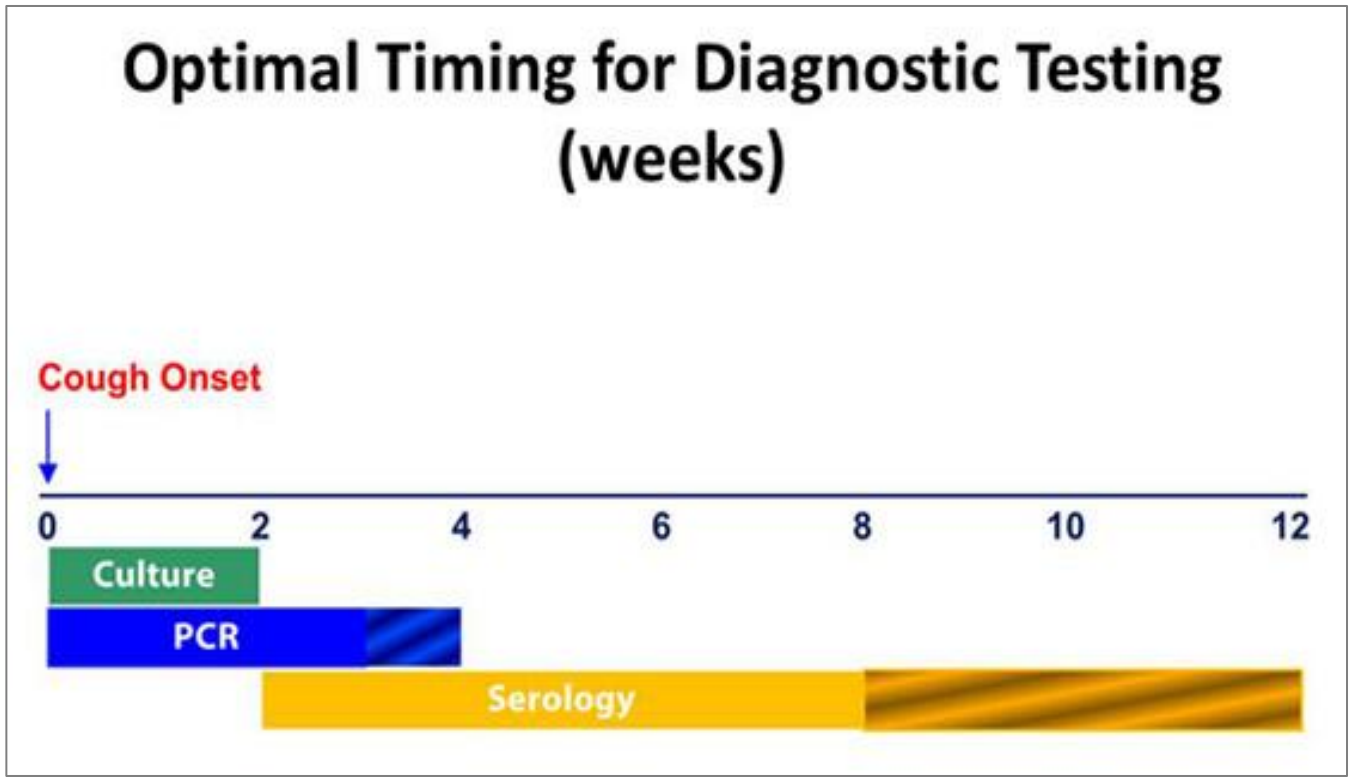
# Suspect Pertussis

- Coughing
  - Worsens after mild “cold”
  - Increasingly severe
- Fine in between coughing
- No fever
- Normal physical examination
- Catching a “cold” after being around someone with pertussis

# Precautions

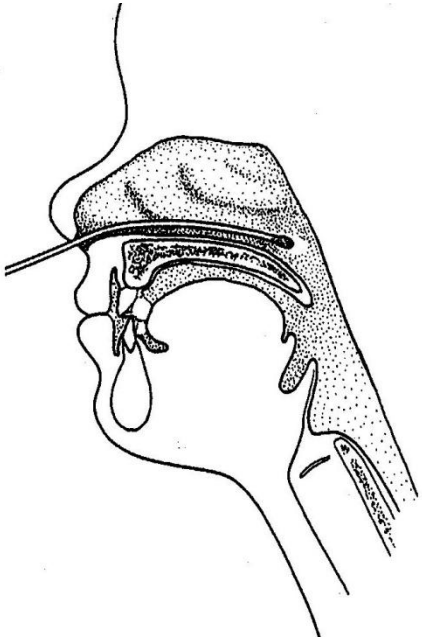
- Droplet Isolation
  - 5 days with correct antibiotics
  - 21 days without antibiotics

# Pertussis Testing




http://www.cdc.gov/pertussis/clinical/diagnostic-testing/diagnosis-confirmation.html

# Pertussis Laboratory Confirmation



# Pertussis Treatment and Prophylaxis

- **Azithromycin once a day for 5 days**
- Clarithromycin twice a day for 7 days
- Erythromycin 4 times a day for 14 days
  - Avoid in infants→risk of pyloric stenosis

- Alternate:  Trimethoprim-sulfamethoxazole

# Postexposure Antibiotic Prophylaxis

- Same antibiotics as for treatment
- Focus on high risk contacts
  - Health care personnel in contact with patients
  - < 1 years old
  - Pregnant women
  - Household members and caretakers of infants
  - Child care workers
  - Children in day care where there are infants

# Pertussis Clinical Case Definition

- Probable:
  - Case meets clinical case definition with no laboratory confirmation or epidemiologic linkage to a laboratory-confirmed case
- Confirmed:
  - Acute cough illness of any duration with isolation of *B. pertussis* from clinical specimen
  - Case meets clinical case definition and is positive on Pertussis PCR or has contact with a laboratory-confirmed case of pertussis

# Vaccination: DTaP

**Routine DTaP Primary Vaccination Schedule**

| Dose | Age | Minimum Interval |
|---|---|---|
| Primary 1 | 2 months | --- |
| Primary 2 | 4 months | 4 weeks |
| Primary 3 | 6 months | 4 weeks |
| Primary 4 | 15-18 months | 6 months |

5th dose: for all children who received all 4 primary doses before his/her 4th birthday, a 5th dose should be given before school entry

# Vaccination: Tdap

- Adolescents 11-18 years
- Adults 19-64 years
- Children 7-10 years of age who are not fully vaccinated against pertussis
- Adults 65 years and older who may have close contact with an infant

# Vaccination: Tdap

- Women during each pregnancy, even if they've received it before
    - Third or late second trimester (after 20 weeks gestation)

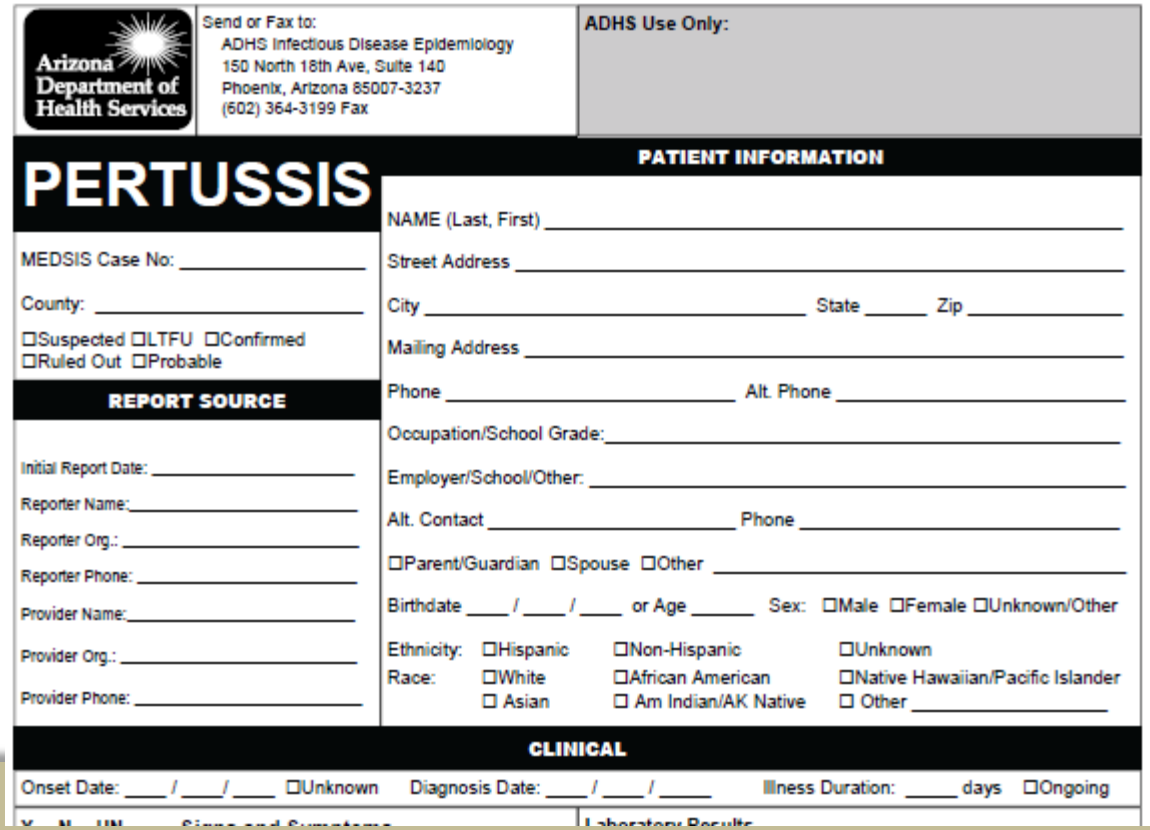
http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6041a4.htm

# Pertussis Control Measures

- Exclusion of cases and symptomatic contacts from school/work settings through 5th day of antibiotic course
- If case is unwilling/unable to take antibiotics, they must be excluded for 21 days
- Assuring vaccinations are up-to-date (DtaP and Tdap)

# Reporting

Notify your local health department (or ADHS) as soon as pertussis is suspected and especially if testing is ordered



Arizona Department of Health Services

Send or Fax to:
ADHS Infectious Disease Epidemiology
150 North 18th Ave, Suite 140
Phoenix, Arizona 85007-3237
(602) 364-3199 Fax

ADHS Use Only:

**PERTUSSIS**

MEDSIS Case No: _____

County: _____

☐Suspected ☐LTFU ☐Confirmed
☐Ruled Out ☐Probable

**REPORT SOURCE**

Initial Report Date: _____
Reporter Name: _____
Reporter Org.: _____
Reporter Phone: _____
Provider Name: _____
Provider Org.: _____
Provider Phone: _____

**PATIENT INFORMATION**

NAME (Last, First) _____
Street Address _____
City _____ State _____ Zip _____
Mailing Address _____
Phone _____ Alt. Phone _____
Occupation/School Grade: _____
Employer/School/Other: _____
Alt. Contact _____ Phone _____
☐Parent/Guardian ☐Spouse ☐Other _____
Birthdate ____ / ____ / ____ or Age _____ Sex: ☐Male ☐Female ☐Unknown/Other
Ethnicity: ☐Hispanic ☐Non-Hispanic ☐Unknown
Race: ☐White ☐African American ☐Native Hawaiian/Pacific Islander
☐ Asian ☐ Am Indian/AK Native ☐ Other _____

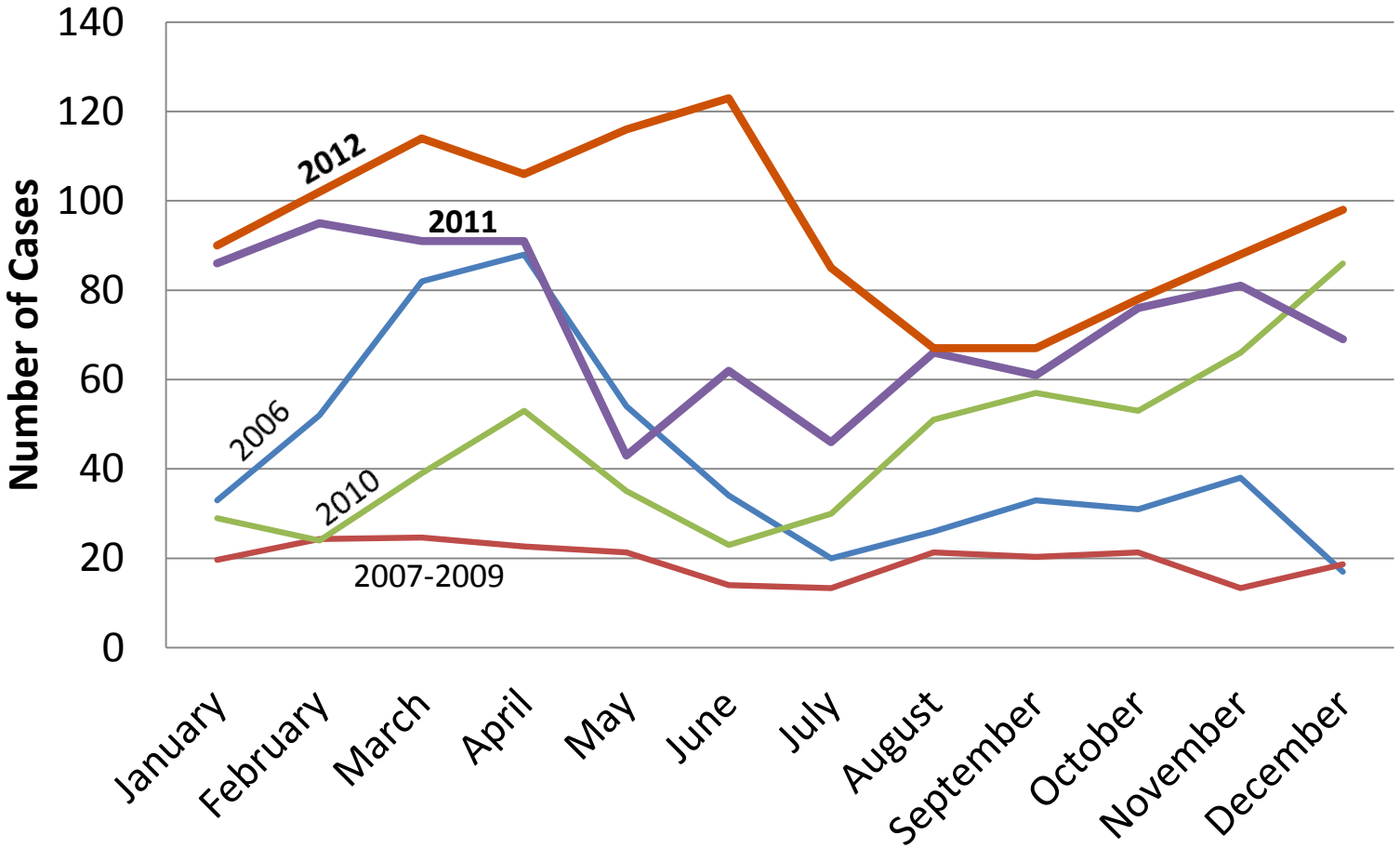
**CLINICAL**

Onset Date: ____ / ____ / ____ ☐Unknown Diagnosis Date: ____ / ____ / ____ Illness Duration: _____ days ☐Ongoing

# Pertussis Clinical Case Definition

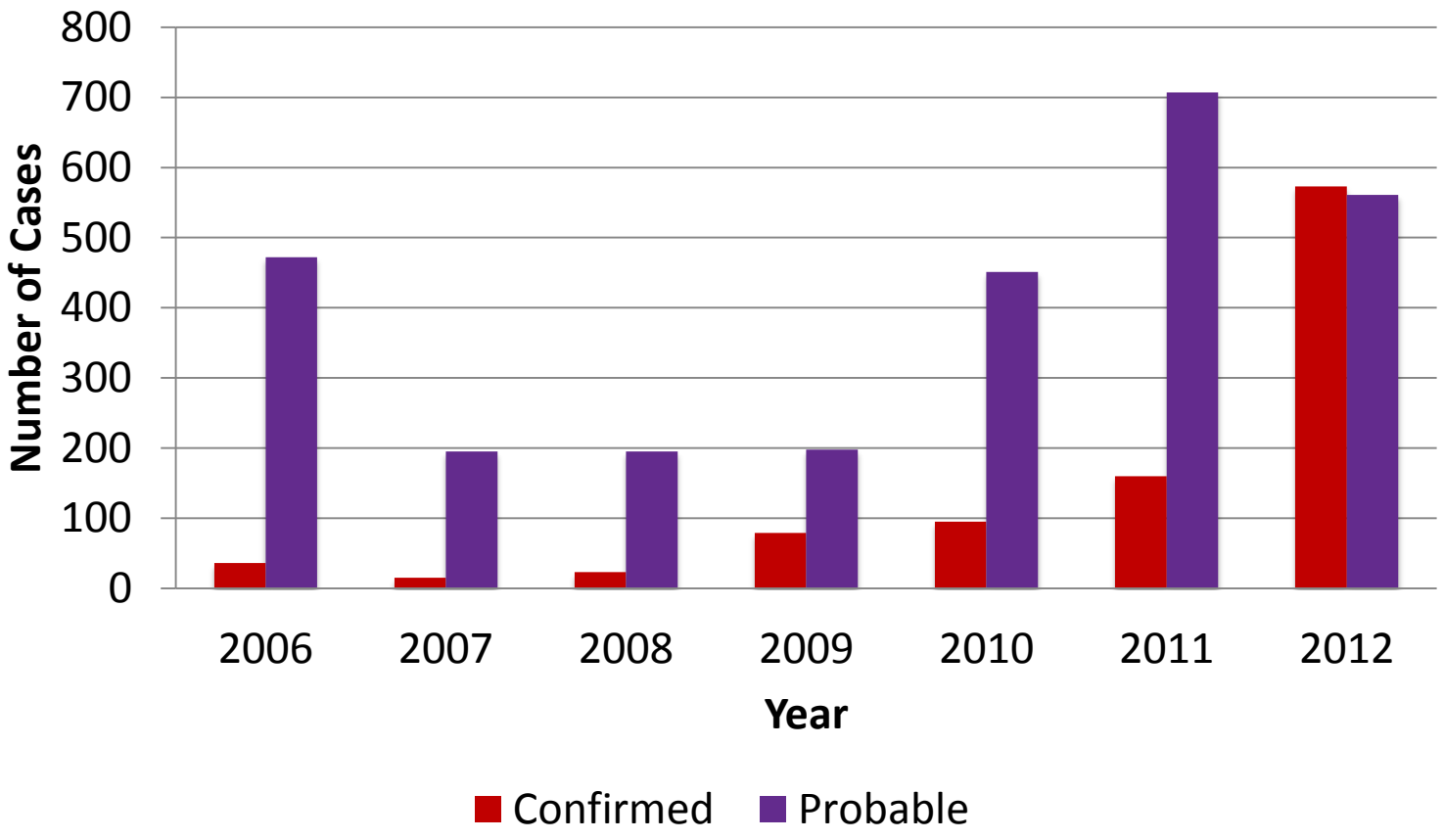
- Clinical Case Definition
  - A cough illness lasting at least 2 weeks with at least one of the following: paroxysms of coughing, inspiratory “whoop,”, or post-tussive vomiting, without other apparent cause) as reported by a health professional
- Laboratory Criteria
  - Isolation of *Bordetella pertussis* from clinical specimen
  - PCR positive result for *B. pertussis*

# Pertussis* in Arizona (2006-2012)



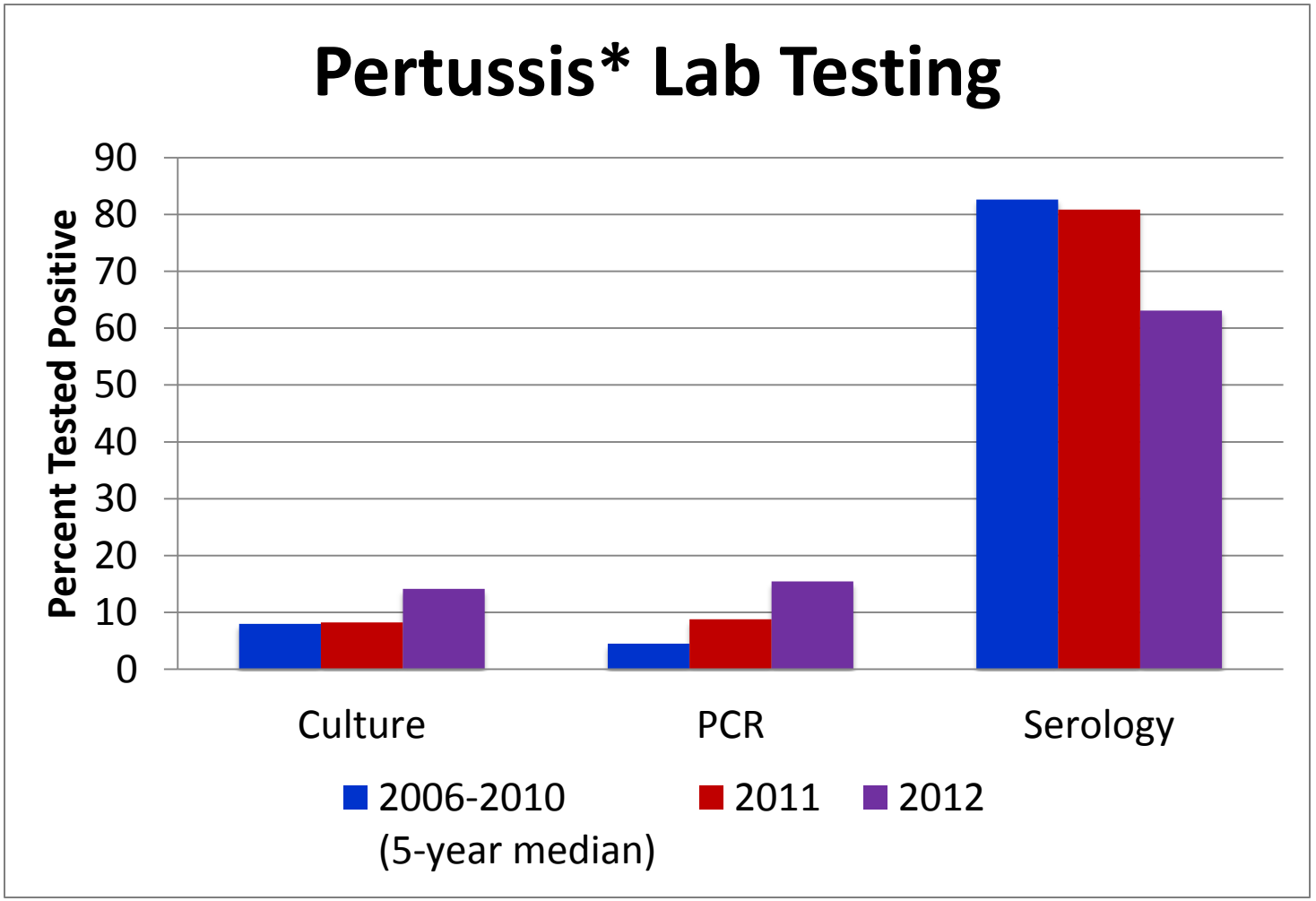

*Confirmed and probable

# Pertussis in Arizona (2006-2012)



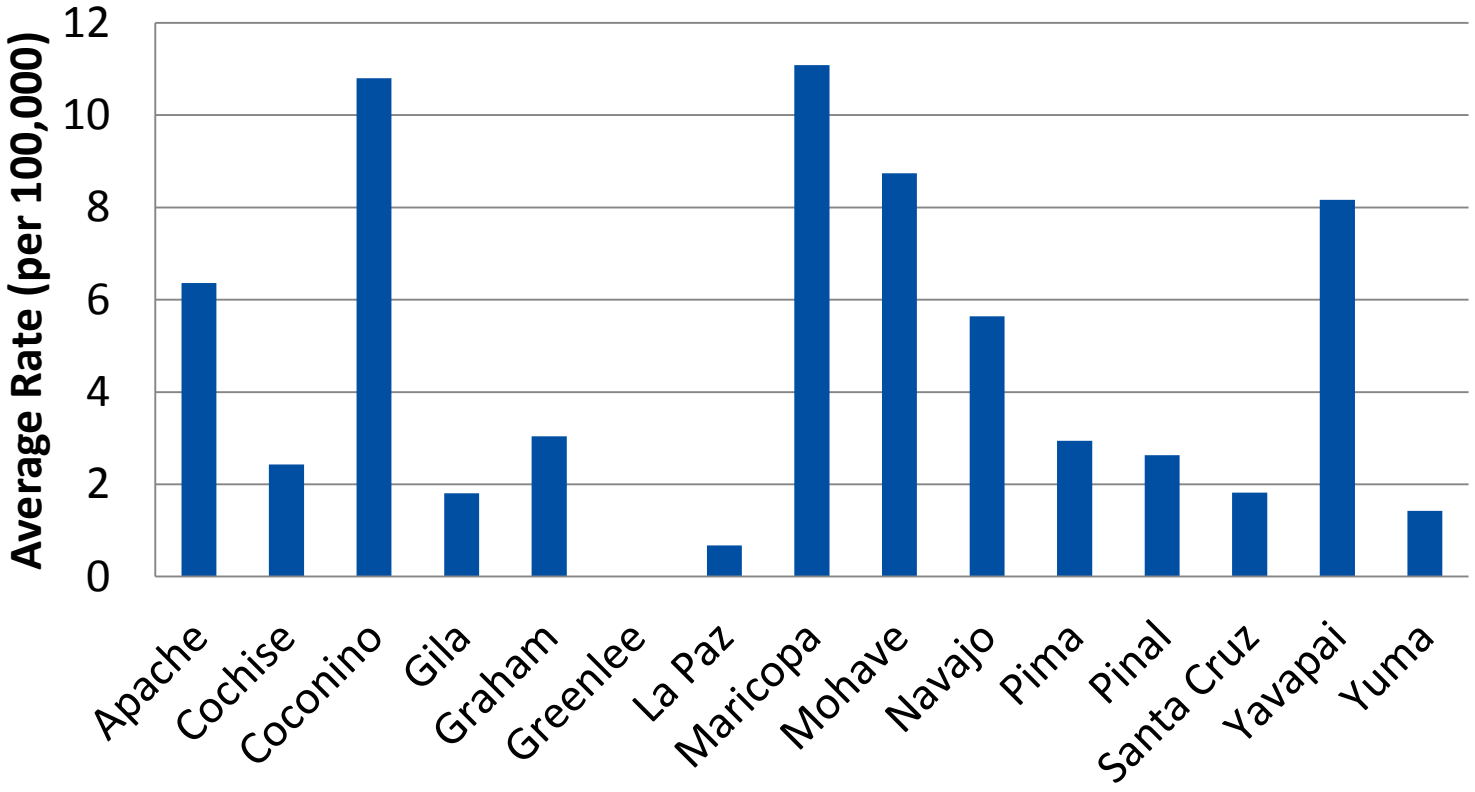
# CDC Pertussis Epi Aid

- To evaluate increased use of serology testing for suspected pertussis cases in Arizona



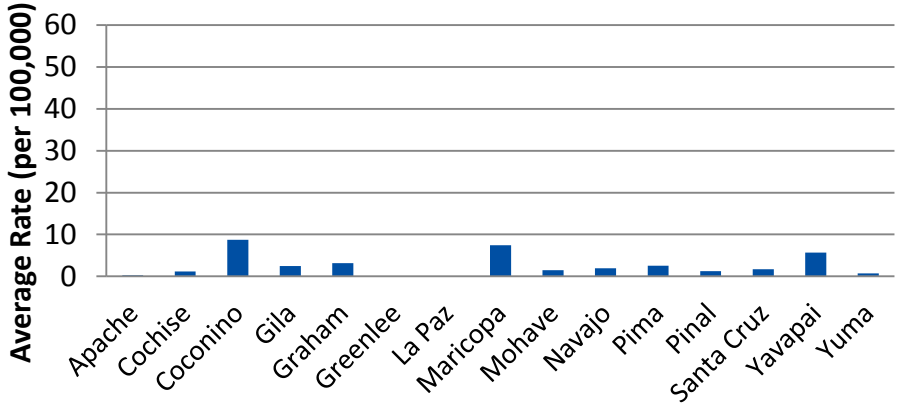

*Confirmed cases

# Pertussis* by County (2006-2012)

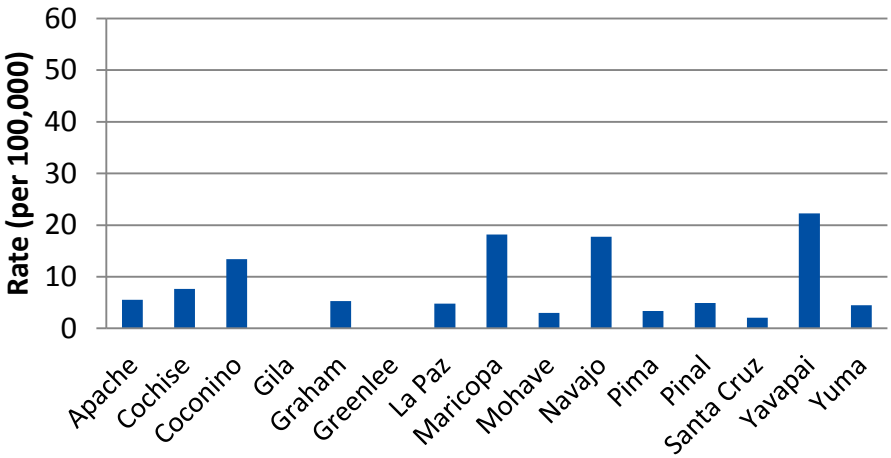



*Confirmed and probable

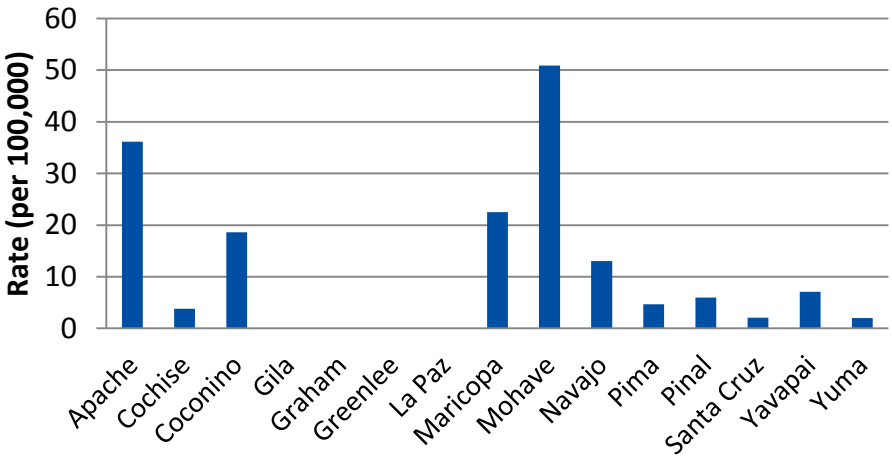
## Pertussis* by County 5-year Median (2006-2010)




## Pertussis* by County (2011)

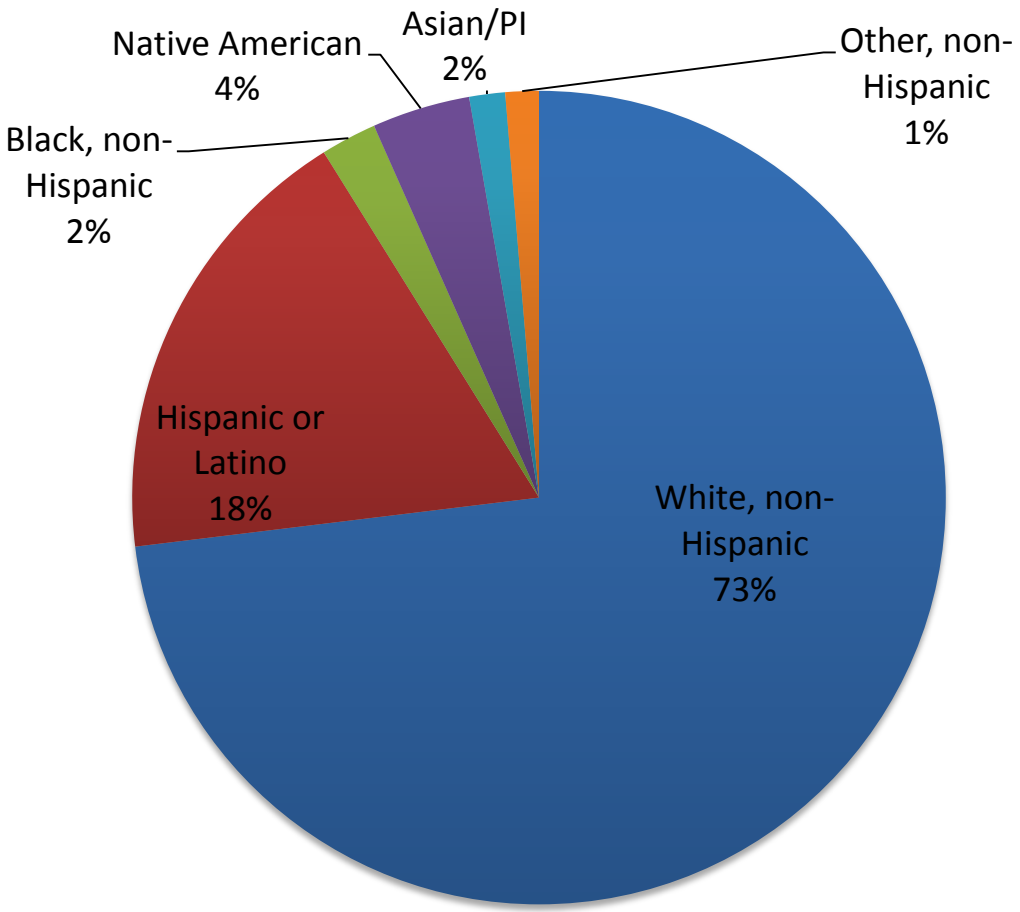



## Pertussis* by County (2012)

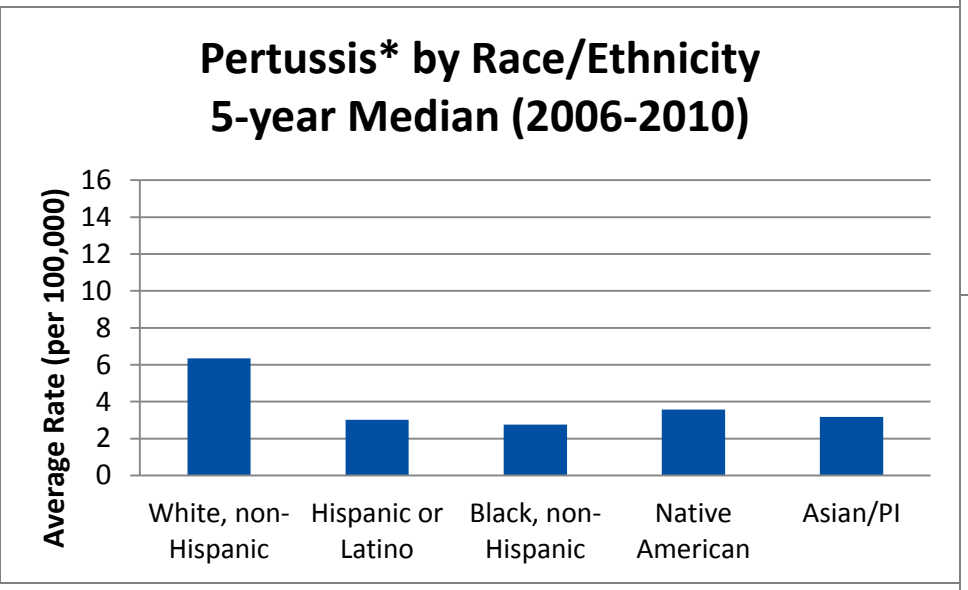


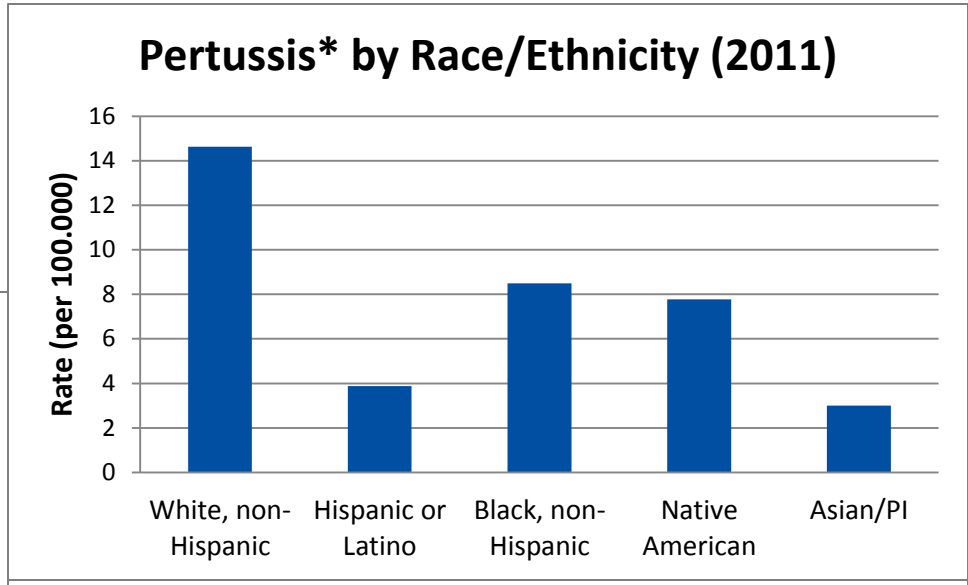

*Confirmed and probable

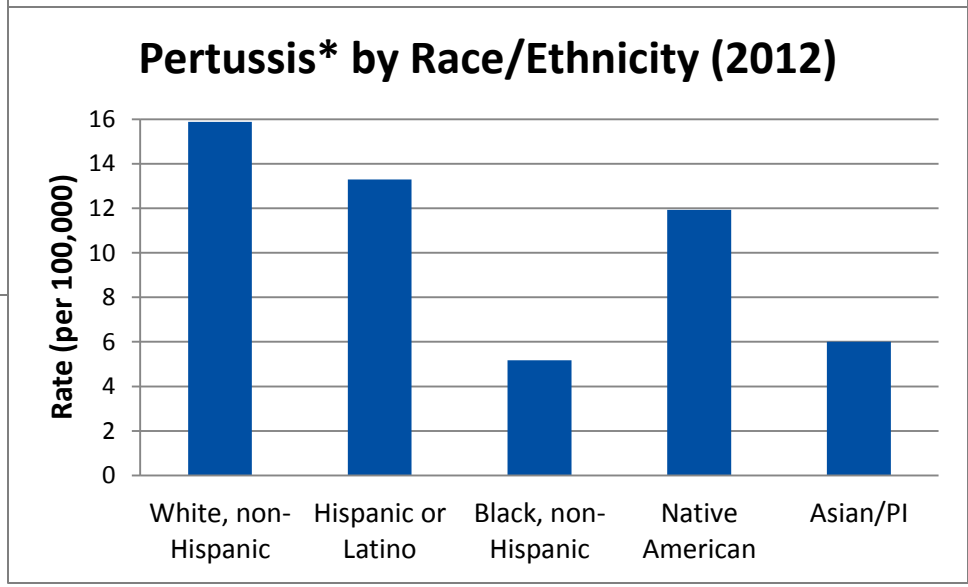
# Pertussis* by Race/Ethnicity




*Confirmed and probable

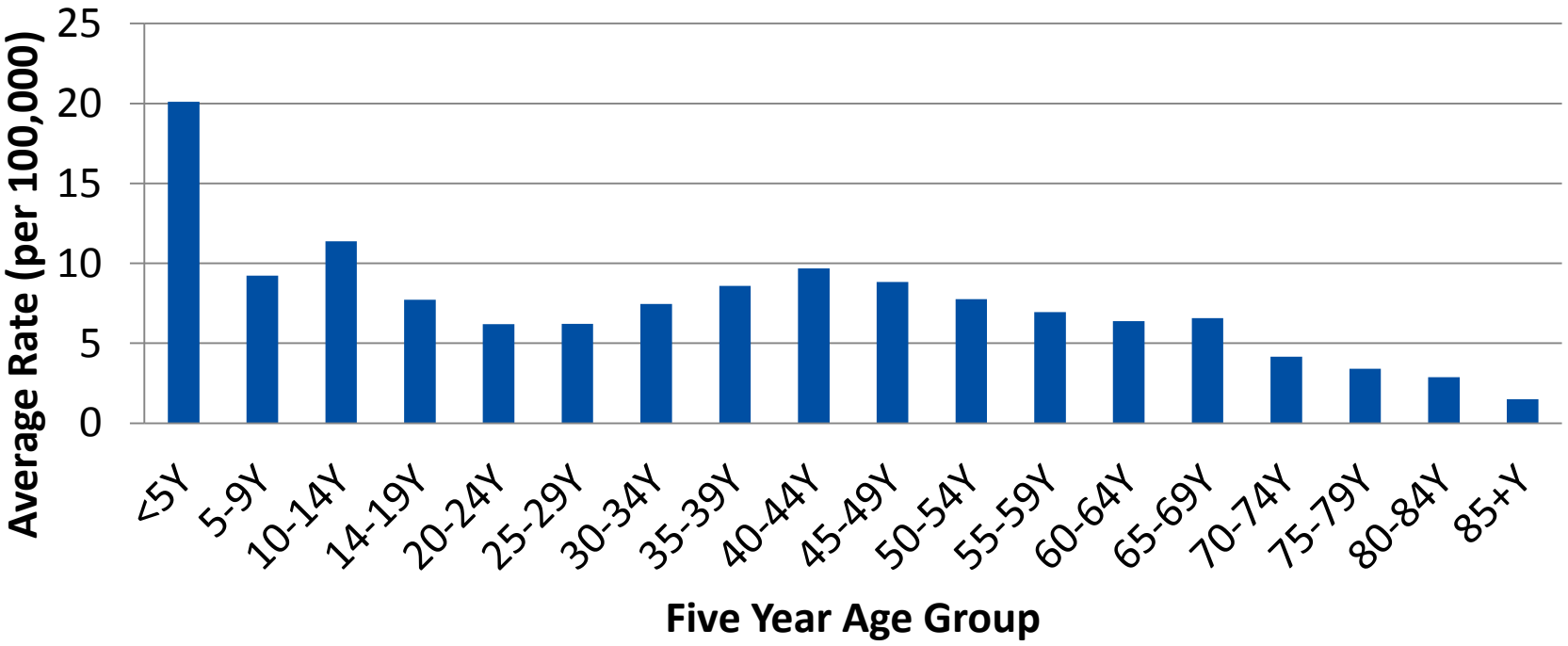



*Confirmed and probable

# Pertussis* by Five Year Age Groups (2006-2012)

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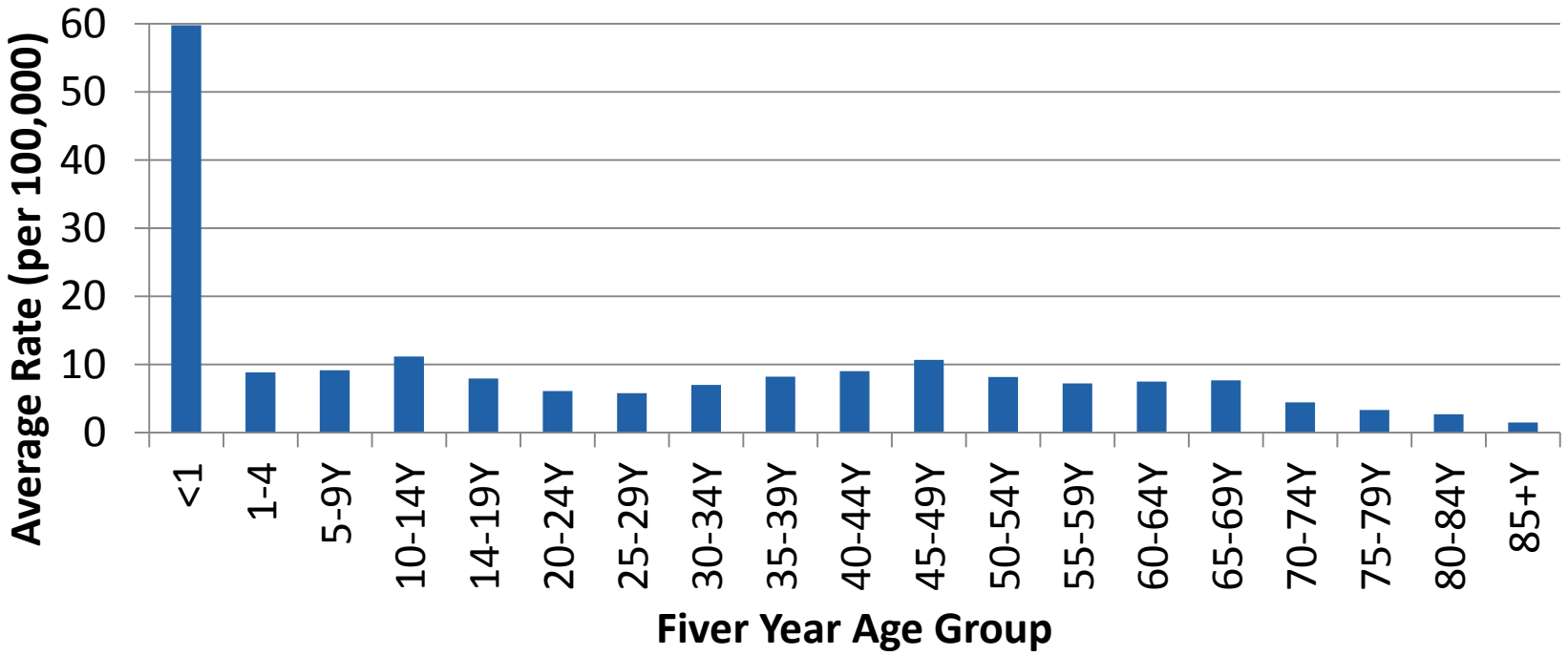
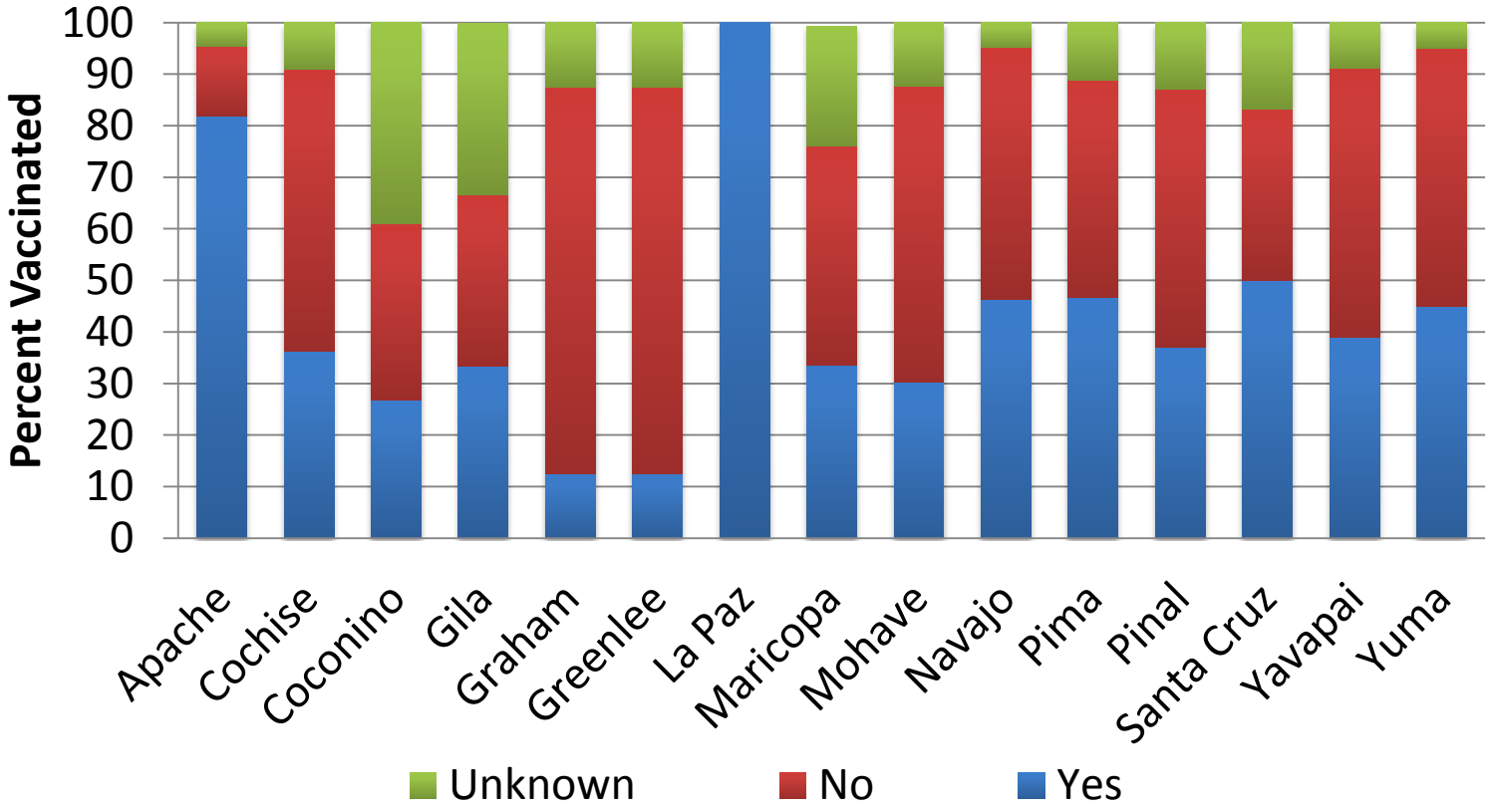


# Vaccination by County (2006-2012)

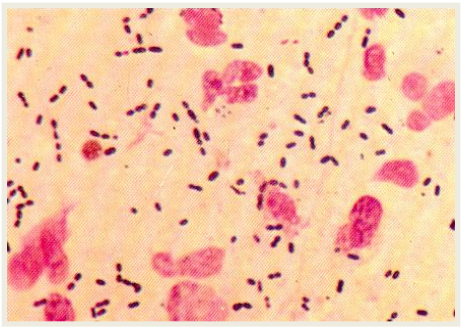


# CDC/Washington State Pertussis Press Conference Highlights, 7/18/12

- Reported pertussis cases are at their highest level in 50 years with more than 18,000 cases reported nationwide and outbreaks in several states
- Nine infant deaths nationwide
- Increased rates in 13-14 year-olds nationwide
- CDC to investigate causes of increase in cases, especially possible waning vaccine immunity in adolescent age-groups
- Transcript available at: **http://www.cdc.gov/media/releases/2012/t0719_pertussis_epidemic.html**

# Invasive Meningococcal Disease

# Invasive Meningococcal Disease



- Gram-negative diplococcus
- Serogroups A, B, C, Y, & W-135 are those most commonly associated with systemic disease
  - Serogroup B is not in the vaccine
- Transmission
  - person-to-person; direct contact with nasopharyngeal secretions or through droplets/saliva
- Incubation period: 1-10 days (usually 2-4)

# Invasive Meningococcal Disease

- Symptoms of meningitis
  - Sudden onset of a stiff neck, high fever, and headache
  - Nausea, vomiting, and mental confusion often present
  - Petechial rash may be present
- Symptoms of meningococcemia
  - Abrupt onset of fever, chills, malaise, prostration, and rash

# Meningococcal Vaccines

- 2 Conjugate and 1 Polysaccharide Vaccines
  - 1st conjugate vaccine licensed in 2005, another recently licensed in US
  - Conjugate vaccine currently approved for ages 9 months – 55 years
  - Polysaccharide vaccine licensed for ages 2 and older
    - Immune response not as strong as conjugate vaccine
- Protects against serogroups A, C, Y, and W-135
  - No protection for Group B

# Vaccination Recommendations

- Recommended for 11-18 year olds
    - First dose: 11-12 years old
    - Booster at 16 years
- Other risk groups
- School requirement:
    - 2012-2013: 6-10$^{th}$ graders
    - Additional grade with every school year
- College freshmen living in dormitories

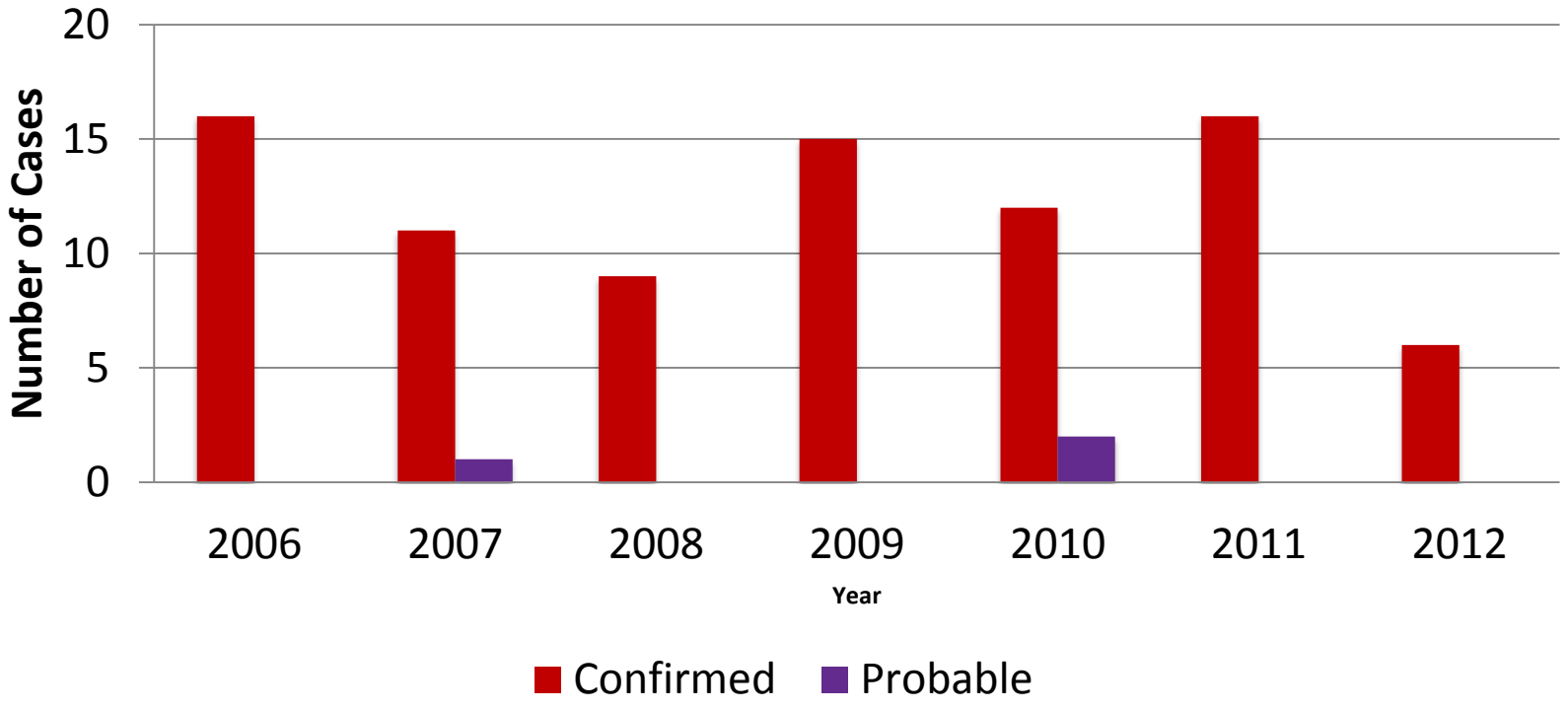
# Meningococcal Case Definition

- Suspected
  - Clinical purpura fulminans in the absence of a positive blood culture; or
  - Gram-negative diplococci, not yet identified, isolated from a normally sterile body site (e.g., blood or CSF)
- Probable
  - Detection of *N. meningitidis*-specific nucleic acid in a specimen obtained from a normally sterile body site (e.g., blood or CSF) using a validated polymerase chain reaction (PCR) assay; or
  - Detection of *N. meningitidis* antigen
    - In formalin –fixed tissues by immunohistochemistry (IHC) OR
    - In CSF by latex agglutination

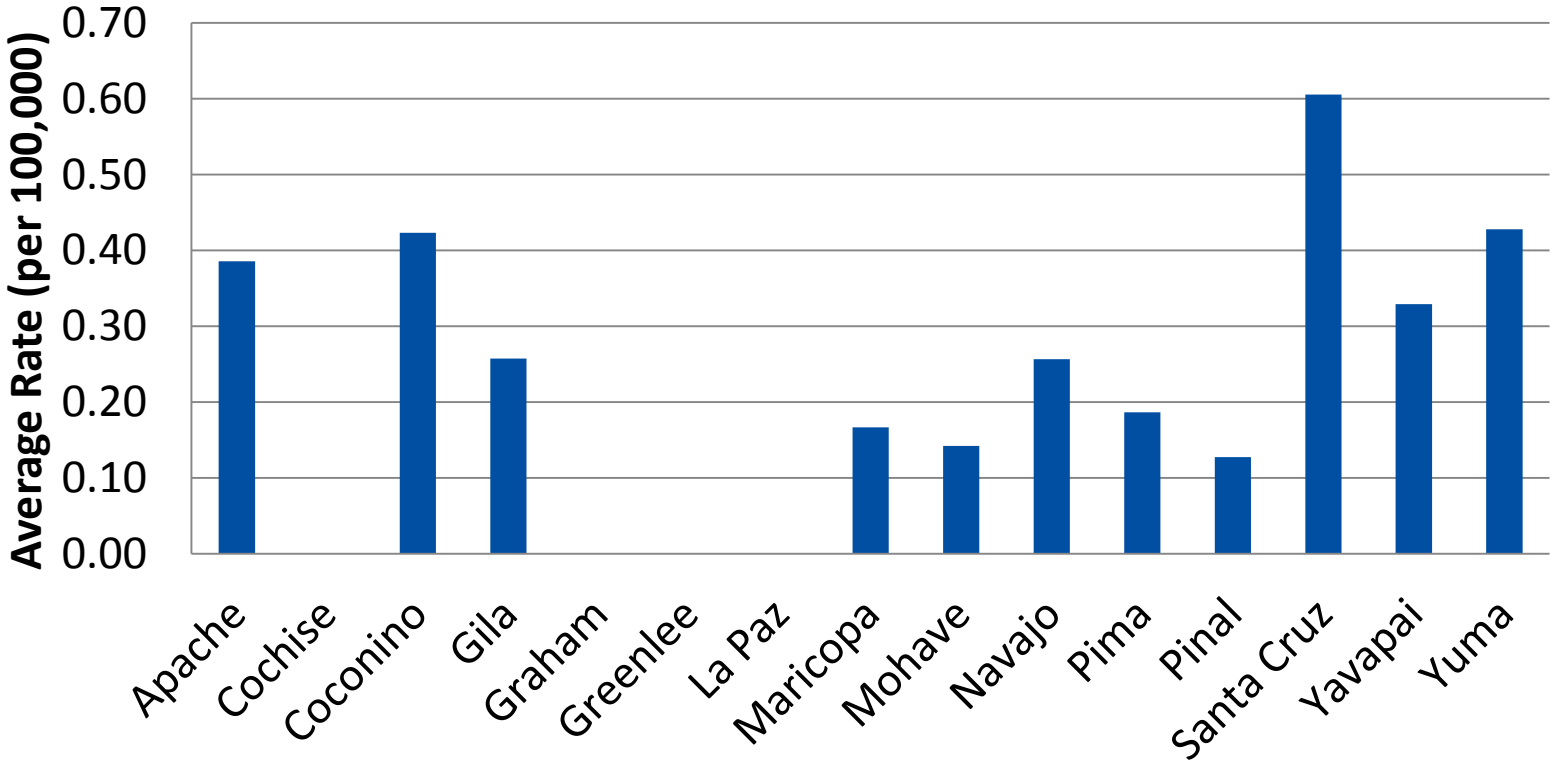
# Meningococcal Case Definition

- Confirmed
  - Isolation of *N. meningitidis*
    - From a normally sterile body site (e.g., blood or cerebrospinal fuid, or, less commonly, synovial, pleural, or pericardial fluid), OR
    - From purpuric lesions

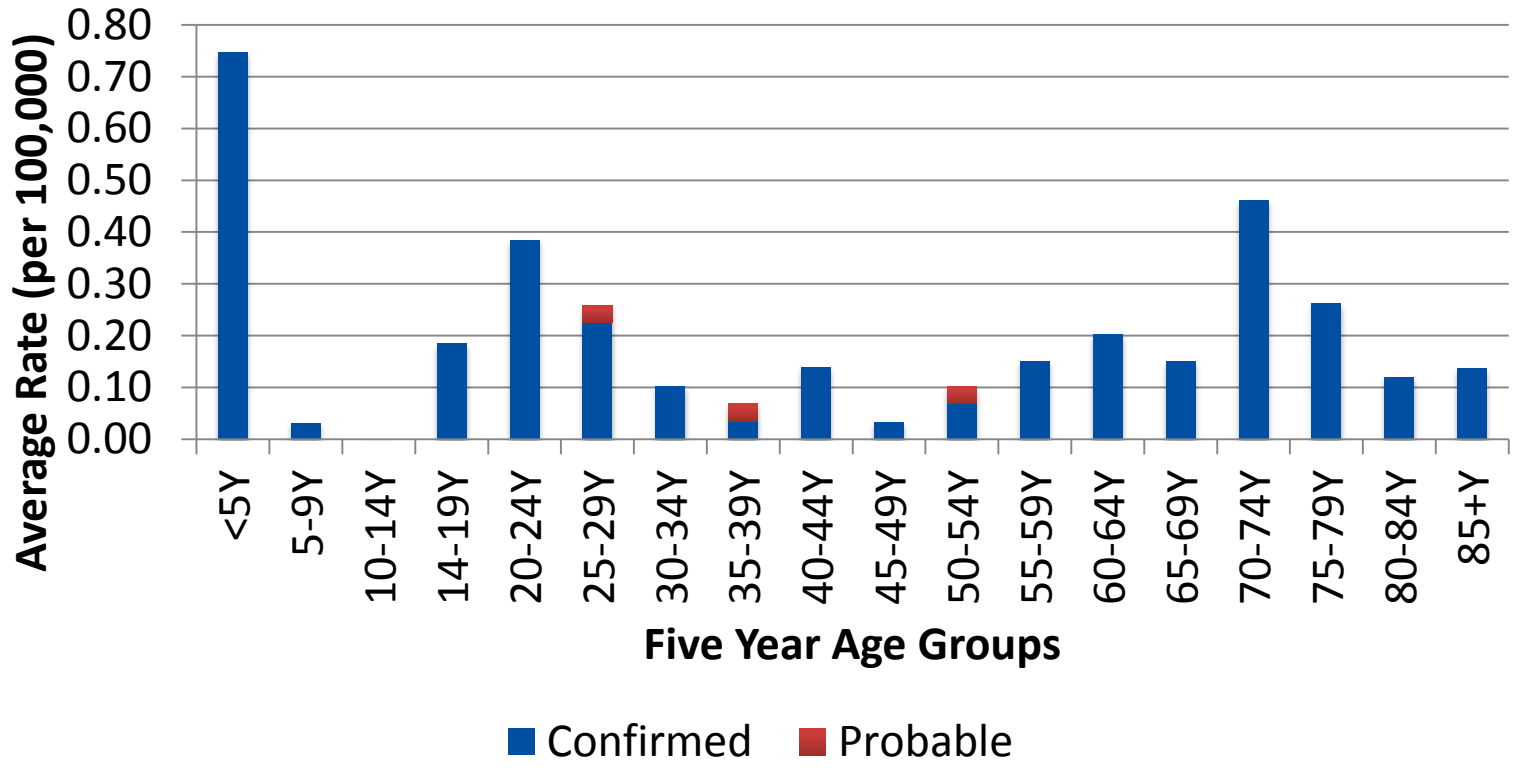
# Meningococcal Disease in Arizona (2006-2012)

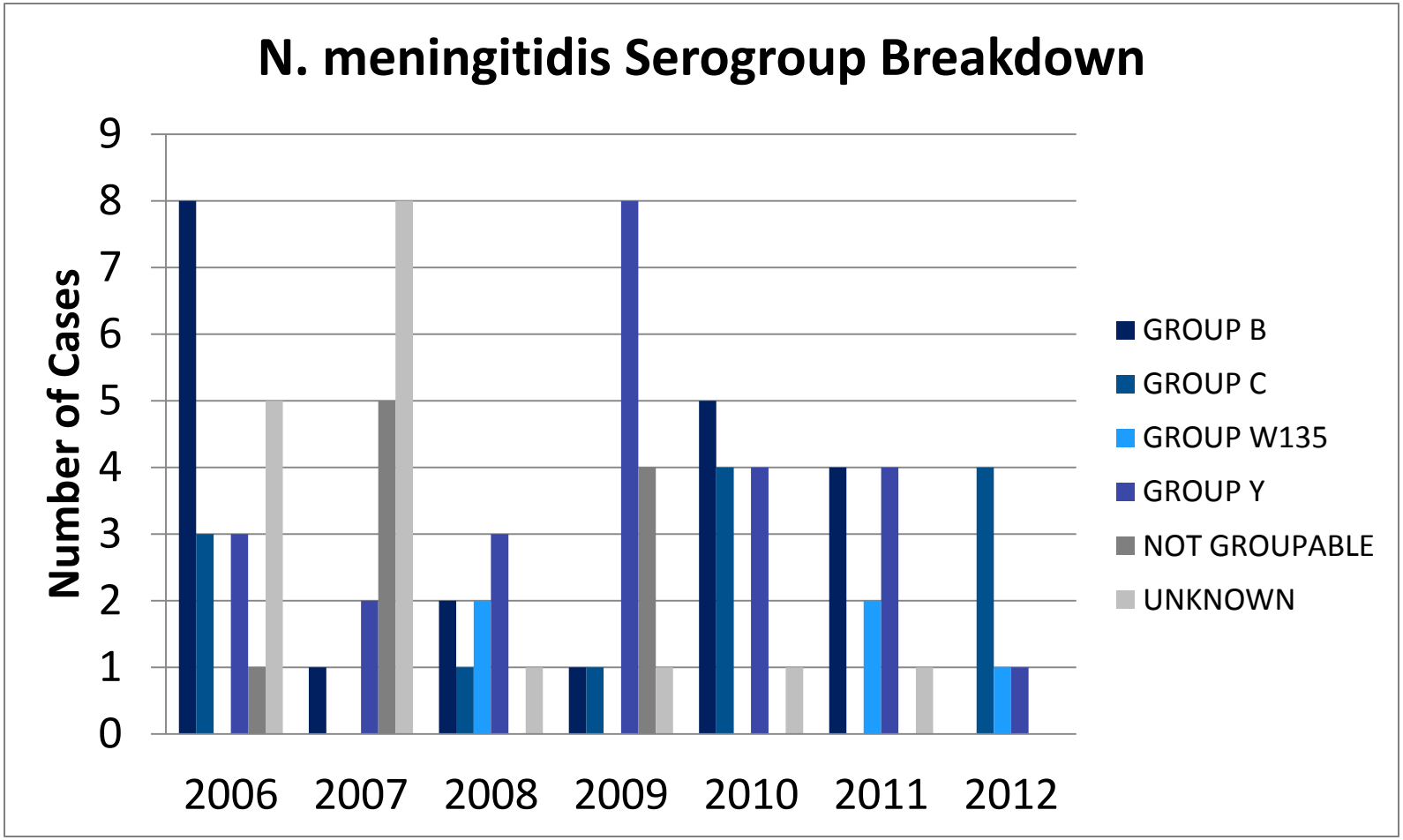


# Meningococcal Disease by County (2006-2012)



# Meningococcal Disease by Five Year Age Groups (2006-2012)




N. meningitidis Serogroup Breakdown
Number of Cases
0
1
2
3
4
5
6
7
8
9
2006
2007
2008
2009
2010
2011
2012
GROUP B
GROUP C
GROUP W135
GROUP Y
NOT GROUPABLE
UNKNOWN

# Meningococcal Disease in AZ 2013

## 7 confirmed cases

| County | Cases |
|---|---|
| Maricopa | 5 |
| Navajo | 1 |
| Yavapai | 1 |

| Serogroup | Cases |
|---|---|
| B | 3 |
| Y | 3 |
| C | 1 |

DCDC
Division of Communicable Disease Control

Preventing infectious diseases. Protecting California.

# CALIFORNIA CD BRIEF

This weekly report of surveillance and laboratory activities from the Division of Communicable Disease Control of the California Department of Public Health contains information on investigations in progress and/or diagnoses that may not yet be confirmed. **CD Brief** is intended primarily for the use of local health departments and infectious disease professionals, should be considered privileged, and should **NOT be distributed** further.

Report of meeting of 03/13/2013 (Week 11)

In this issue:



## *Increase in Meningococcal Disease in Tijuana, Mexico with Epidemiologically-Linked Cases in California – March 15, 2013*

Since January 1, 2013, there has been an increase in the number of cases of meningococcal disease in the municipality of Tijuana, Mexico. To date, 25 suspect cases have been reported; 17 are confirmed or probable cases and 16 of these had disease caused by serogroup C *Neisseria meningitidis*. The most recent case was confirmed March 14, 2013. The average number of confirmed meningococcal disease cases per year over the last seven years in Tijuana has been five (range 2 to 9, peak season 2007-2008).

GLMA
Health Professionals
Advancing LGBT Equality

# New York State DOH Expands Meningococcal Vaccination Recommendation to MSM who have Traveled to NYC

On March 25, 2013, the New York State Department of Health (DOH) expanded a recommendation issued earlier in March by the New York City Department of Health and Mental Hygiene (NYCDOHMH) regarding meningococcal vaccinations for men who have sex with men (MSM). These meningococcal vaccine recommendations have been issued in response to an outbreak of invasive meningococcal disease (IMD) in New York City.

Meningococcal disease is a severe bacterial infection of the bloodstream. Common symptoms include high fever, headache, vomiting, stiff neck, and a rash. Symptoms may occur two to 10 days after exposure, but usually within five days. Since 2010, 22 men residing in NYC and one man who resides outside the City, but spent significant time there, have become ill in this outbreak, seven have died.

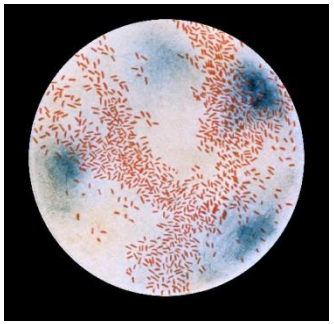
The recommendation by DOH has been expanded to include MSM residing outside NYC who have traveled to the City and engaged in the risk behaviors described below since September 1, 2012.

The following groups were identified by NYCDOHMH as being at highest risk of IMD and are being advised to obtain a quadravalent meningococcal vaccination:

- All HIV-infected MSM
- MSM, regardless of HIV status, who regularly have close or intimate sexual contact with men met through an online website, digital application ("app") or at a bar or party. (Previously, meningococcal vaccination was recommended only for those with contact in certain high risk areas in New York City.)

# *Haemophilus influenzae* type b

# *Haemophilus influenzae* invasive



- Gram negative coccobacillus
  - Two types
    - Encapsulated ( 6 types designated ‘A’ through ‘F’)
    - Not encapsulated (‘non-typable’)
  - Type b the most likely to cause severe disease in children < 5
- All invasive infections are reportable to ADHS
  - Labs required to submit isolates for serotyping at the state laboratory

# *Haemophilus influenzae, type b*

- Prior to vaccine availability, was a major cause of bacterial meningitis in children under 5 years of age
- Mode of transmission thought to be through respiratory droplets
  - Humans are main reservoir for the organism
  - Hib does not survive in the environment on inanimate surfaces
  - Secondary infections are rare
    - Secondary attack rates estimated between 0 – 2.7%
- Non-encapsulated (non-typable) disease typically less virulent
  - No recommended public health intervention for non-type b infections

# Vaccination: Hib

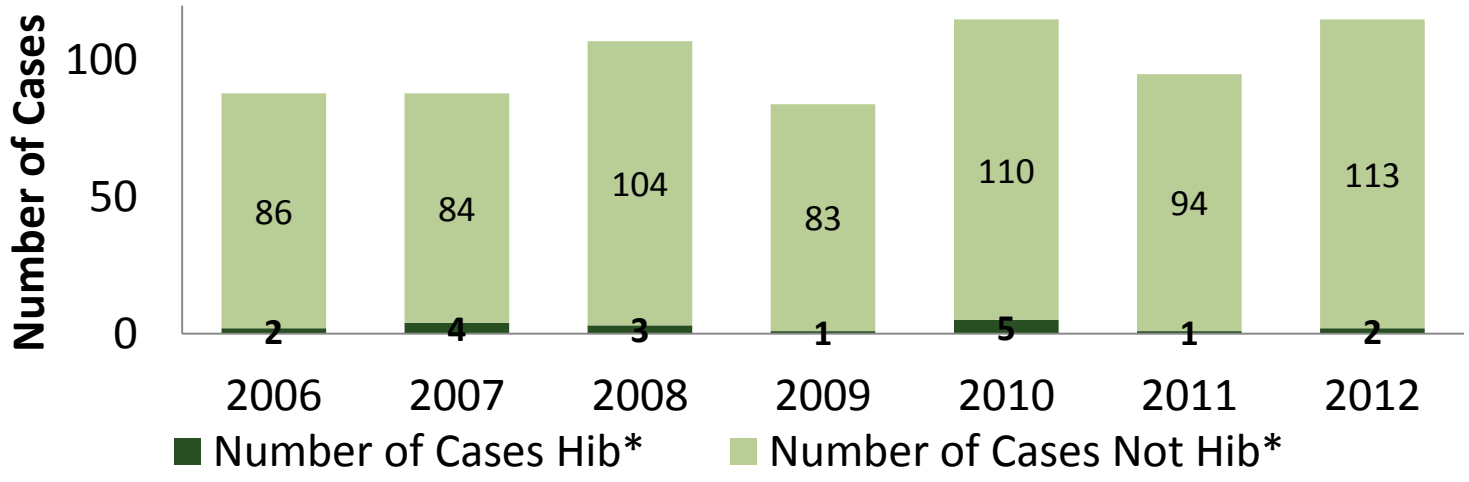
| Vaccine | 2 Months | 4 Months | 6 Months | 12-15 Months |
|---|---|---|---|---|
| PRP-T* | Dose 1 | Dose 2 | Dose 3 | Booster |
| PRP-OMP | Dose 1 | Dose 2 | | Booster |

# *Haemophilus influenzae* Clinical Case Definition

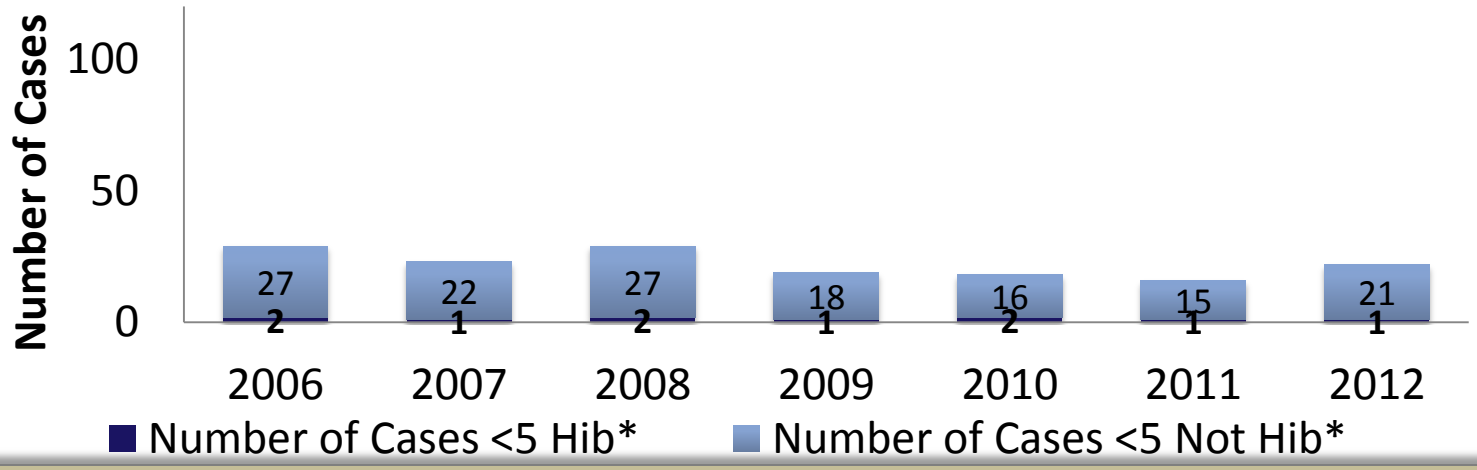
- Probable
  - Meningitis with detection of *Haemophilus influenzae* type b antigen in CSF

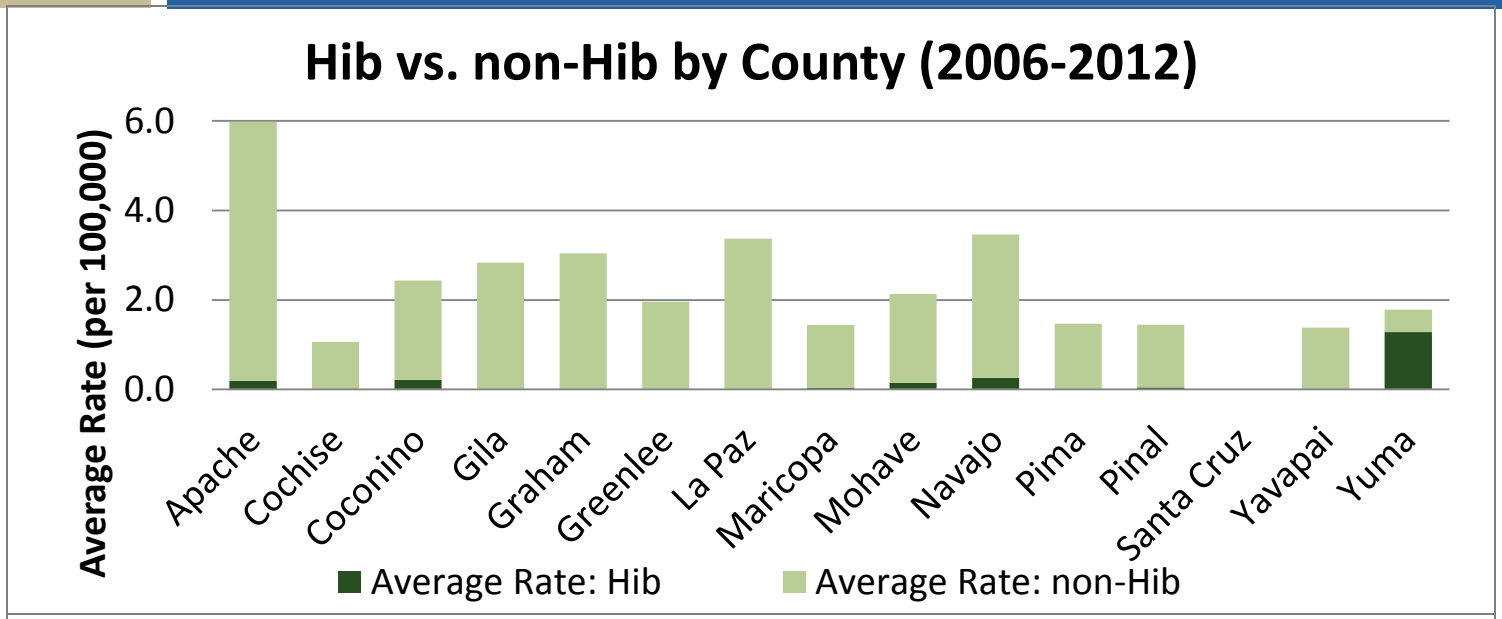
- Confirmed
  - Isolation of *Haemophilus influenzae* from a normally sterile body site (e.g., blood or CSF, or less commonly, joint, pleural, or pericardial fluid)

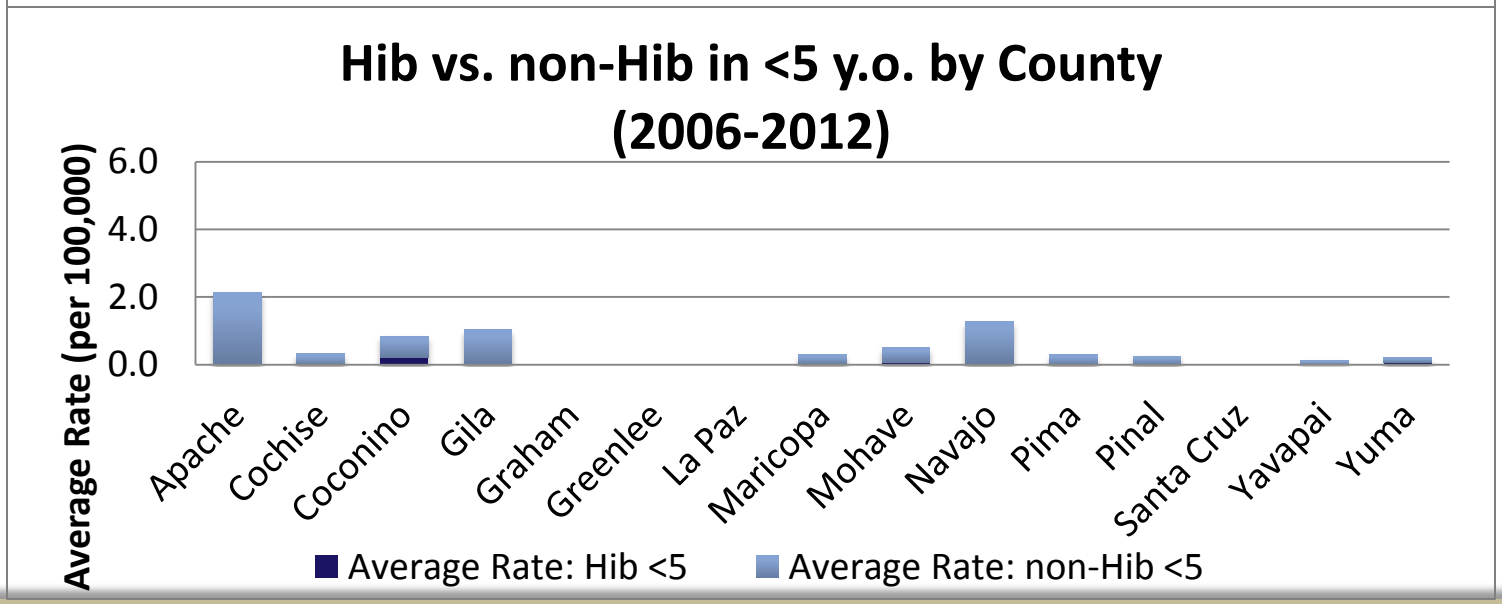
## Hib vs. non-Hib by Year (2006-2012)



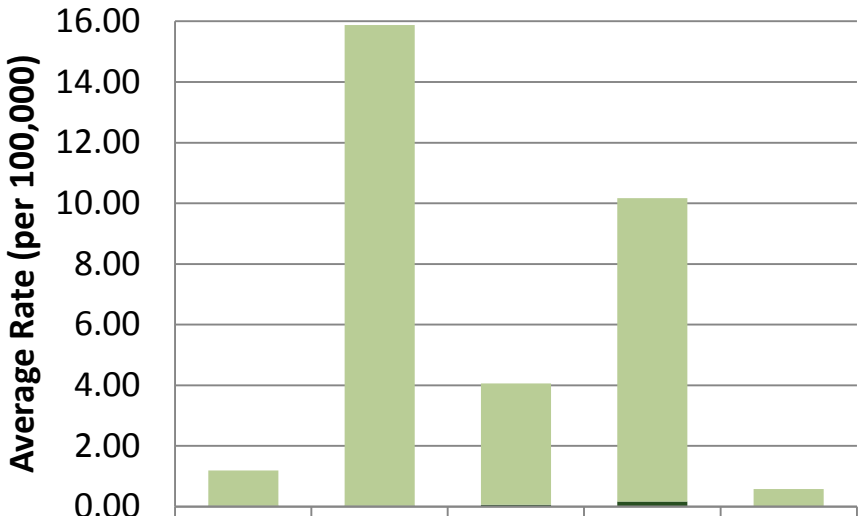

## Hib vs. non-Hib in <5 Year Olds by Year (2006-2012)




Hib vs. non-Hib by County (2006-2012)
Average Rate (per 100,000)
6.0
4.0
2.0
0.0
Apache
Cochise
Coconino
Gila
Graham
Greenlee
La Paz
Maricopa
Mohave
Navajo
Pima
Pinal
Santa Cruz
Yavapai
Yuma
Average Rate: Hib
Average Rate: non-Hib

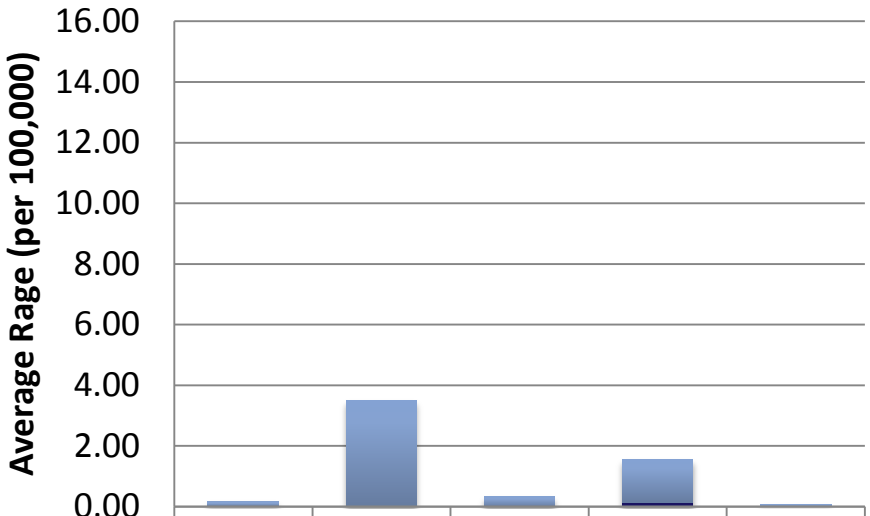

Hib vs. non-Hib in <5 y.o. by County (2006-2012)
Average Rate (per 100,000)
6.0
4.0
2.0
0.0
Apache
Cochise
Coconino
Gila
Graham
Greenlee
La Paz
Maricopa
Mohave
Navajo
Pima
Pinal
Santa Cruz
Yavapai
Yuma
Average Rate: Hib <5
Average Rate: non-Hib <5

## Hib vs. non-Hib by Race/Ethnicity (2006-2012)

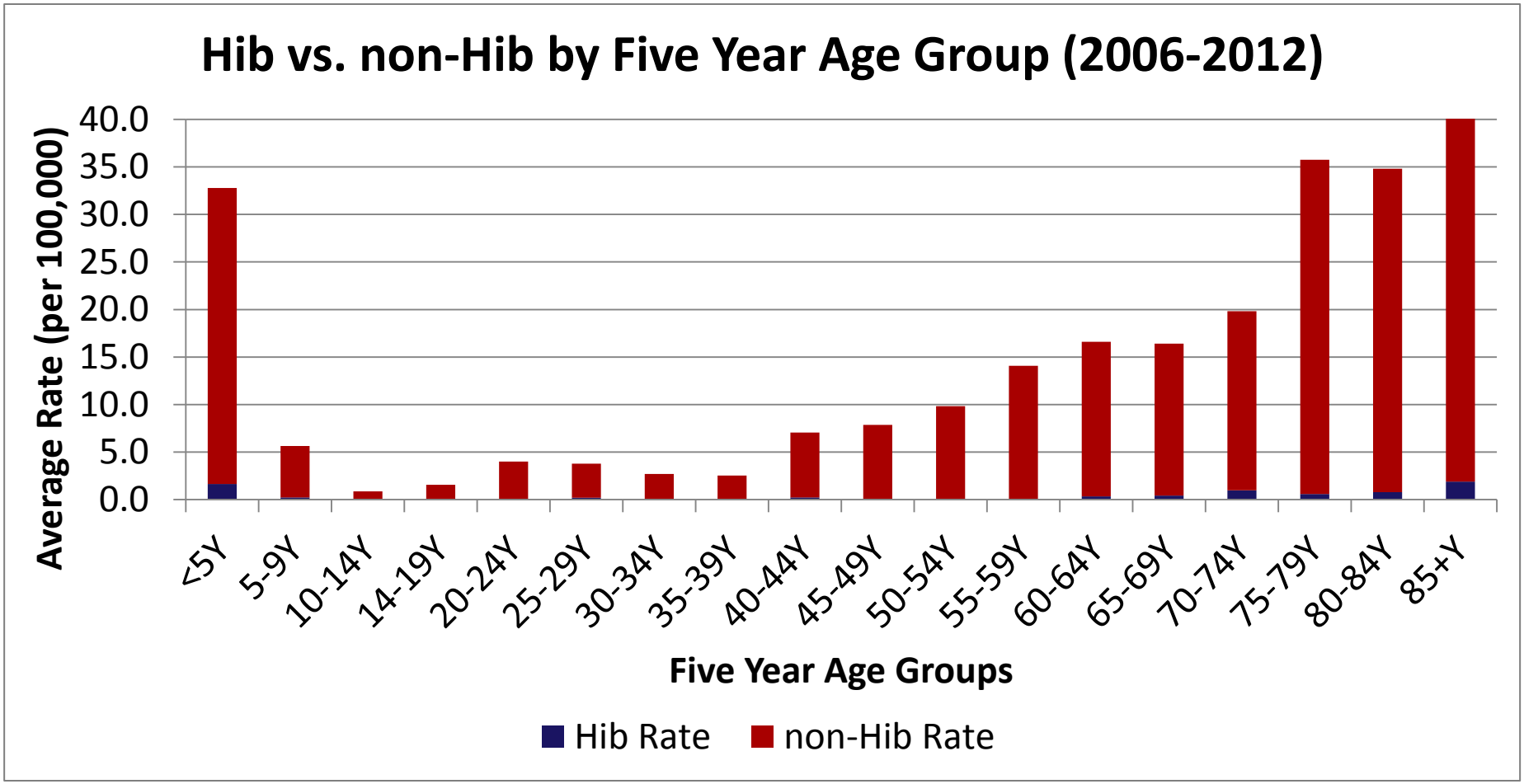



| | White, non-Hispanic | Hispanic or Latino | Black, non-Hispanic | Native American | Asian/PI |
|---|---|---|---|---|---|
| non-Hib | 1.17 | 15.86 | 4.00 | 10.00 | 0.57 |
| Hib | 0.03 | 0.02 | 0.05 | 0.17 | 0.00 |

## Hib vs. non-Hib in <5 y.o. by Race/Ethnicity (2006-2012)




| | White, non-Hispanic | Hispanic or Latino | Black, non-Hispanic | Native American | Asian/PI |
|---|---|---|---|---|---|
| non-Hib | 0.14 | 3.49 | 0.33 | 1.43 | 0.08 |
| Hib | 0.01 | 0.02 | 0.00 | 0.13 | 0.00 |


Hib vs. non-Hib by Five Year Age Group (2006-2012)
Average Rate (per 100,000)
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
<5Y
5-9Y
10-14Y
14-19Y
20-24Y
25-29Y
30-34Y
35-39Y
40-44Y
45-49Y
50-54Y
55-59Y
60-64Y
65-69Y
70-74Y
75-79Y
80-84Y
85+Y
Five Year Age Groups
Hib Rate
non-Hib Rate

# Measles

# Measles

- Highly infectious viral disease
- Airborne transmission
- Virus can remain in air for hours
- Communicability: through 4th day after rash onset
- Incubation Period: 7–18 days
- Clinical features
  - Prodrome of fever (up to 103°F or higher) and “Three C’s” (coryza, conjunctivitis, cough)
  - Maculopapular rash

# Measles Rash

- Maculopapular, appears 2-4 days after prodrome
- Begins on face and head and moves down body
- Becomes confluent
- Fades in order of appearance
- Lasts 5-6 days

# Measles Laboratory Testing

- Specimens to collect are blood, nasopharyngeal swab, and urine
  - Blood for Measles IgM antibody testing
  - NP and Urine for PCR testing
- NP and urine are best obtained within 7 days of rash onset (closer to onset is always better for PCR)
- Blood best at least 3 days after onset
- PCR testing most important
  - Allows for confirmation of the presence of measles virus
  - Genotyping available at CDC to confirm virus origin

# Measles Clinical Case Definition

- An illness characterized by:
  - A generalized rash lasting greater or equal to 3 days
  - A temperature greater or equal to 101.0° F
  - Cough, coryza, or conjunctivitis
- Laboratory criteria for diagnosis
  - Isolation of measles virus from a clinical specimen
  - Detection of measles virus-specific nucleic acid by polymerase chain reaction
  - Significant rise in serum measles immunoglobulin G antibody level between acute- and convalescent-phase specimens, by any standard serologic assay
  - Positive serologic test for measles immunoglobulin M antibody

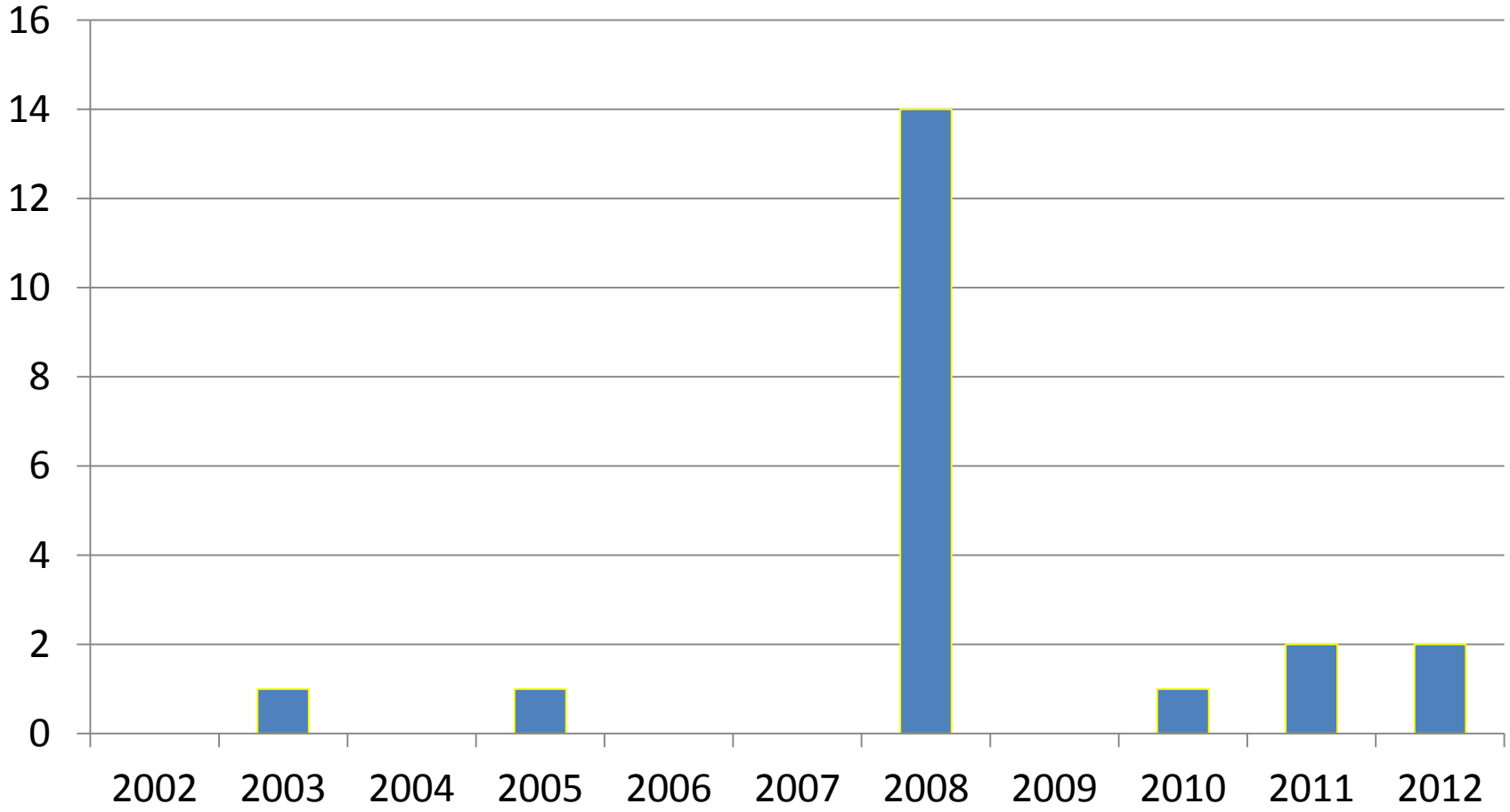
# Measles Case Classification

- Suspected
  - Any febrile illness accompanied by rash
- Probable
  - A case that meets the clinical case definition, has noncontributory or no serologic or virologic testing, and is not epidemiologically linked to a confirmed case
- Confirmed
  - A case that is laboratory confirmed or that meets the CCD and is epi-linked to a confirmed case

# 2012 Confirmed Measles in Coconino County

- Unvaccinated child with no travel history
- On 7/4 developed fever and the three C's (cough, coryza, and conjunctivitis)
- On 7/8, developed rash starting on face and moving down body, also developed Koplik spots and photophobia
- IgM positive for measles at both LabCorp and Arizona State Public Health Laboratory
- Unimmunized brother also developed measles symptoms and was PCR positive at Arizona State Laboratory
- Potential exposure sites included hospital ER, pediatrician's office and laboratory.
- **No spread!**

# Arizona Confirmed Measles Cases 2002-2012



# Mumps

# Mumps


- Viral illness
- Respiratory transmission
- Communicability thought to be similar to that of influenza and rubella
- Infective period from 2-3 days before onset of parotitis to 4 to 5 days after onset
- Nonspecific prodrome of myalgia, anorexia, malaise, headache, low-grade fever
- Parotitis occurs in 30-40% of infected persons, may be unilateral or bilateral
- Symptoms tend to decrease after one week

# Mumps Laboratory Testing

- Specimens for laboratory testing important
  - Buccal and oropharyngeal swabs
    - For PCR and viral culture
      - CDC particularly interested in testing isolated cases
    - Ideally collected within 1 to 3 days after the onset of symptoms
  - Blood
    - IgM testing
    - Collected at same time as viral specimens
      - IgM rise may be delayed in vaccinated populations

# Laboratory Criteria for Mumps Diagnosis

- Isolation of mumps virus from clinical specimen
- Detection of mumps nucleic acid on mumps PCR
- Detection of mumps IgM antibody
- Significant rise in serum mumps IgG antibody level between acute- and convalescent-phase specimens, by any standard serologic assay

# Mumps Clinical Case Definition

- An illness with acute onset of unilateral or bilateral tender, self-limited swelling of the parotid and/or other salivary gland(s), lasting at least 2 days, without other apparent cause.

- Infection may present as aseptic meningitis, encephalitis, hearing loss, orchitis, oophoritis, parotitis, or other salivary gland swelling, mastitis, or pancreatitis

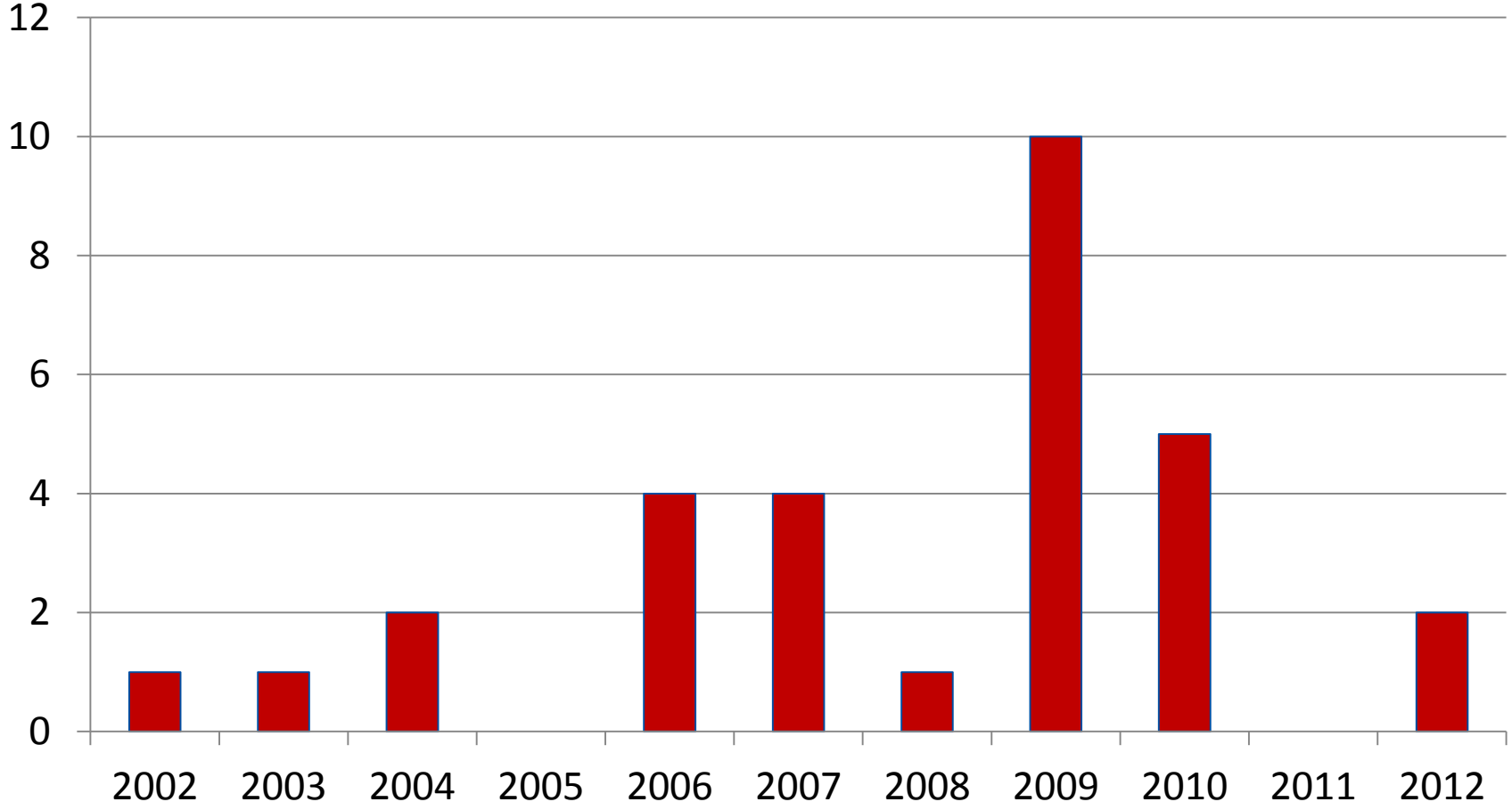
# Mumps Surveillance Case Definition

- Confirmed: A case that meets the clinical case definition or has clinically compatible illness AND is either lab confirmed or epi-linked to a confirmed case
- Probable: A case that meets the clinical case definition without laboratory confirmation and is epi-linked to a clinically compatible case.
- Suspect: A case with clinically compatible illness or that meets the clinical case definition without lab testing, or a case with lab tests suggestive of mumps without clinical information.

# 2012 Mumps Cluster, Maricopa County

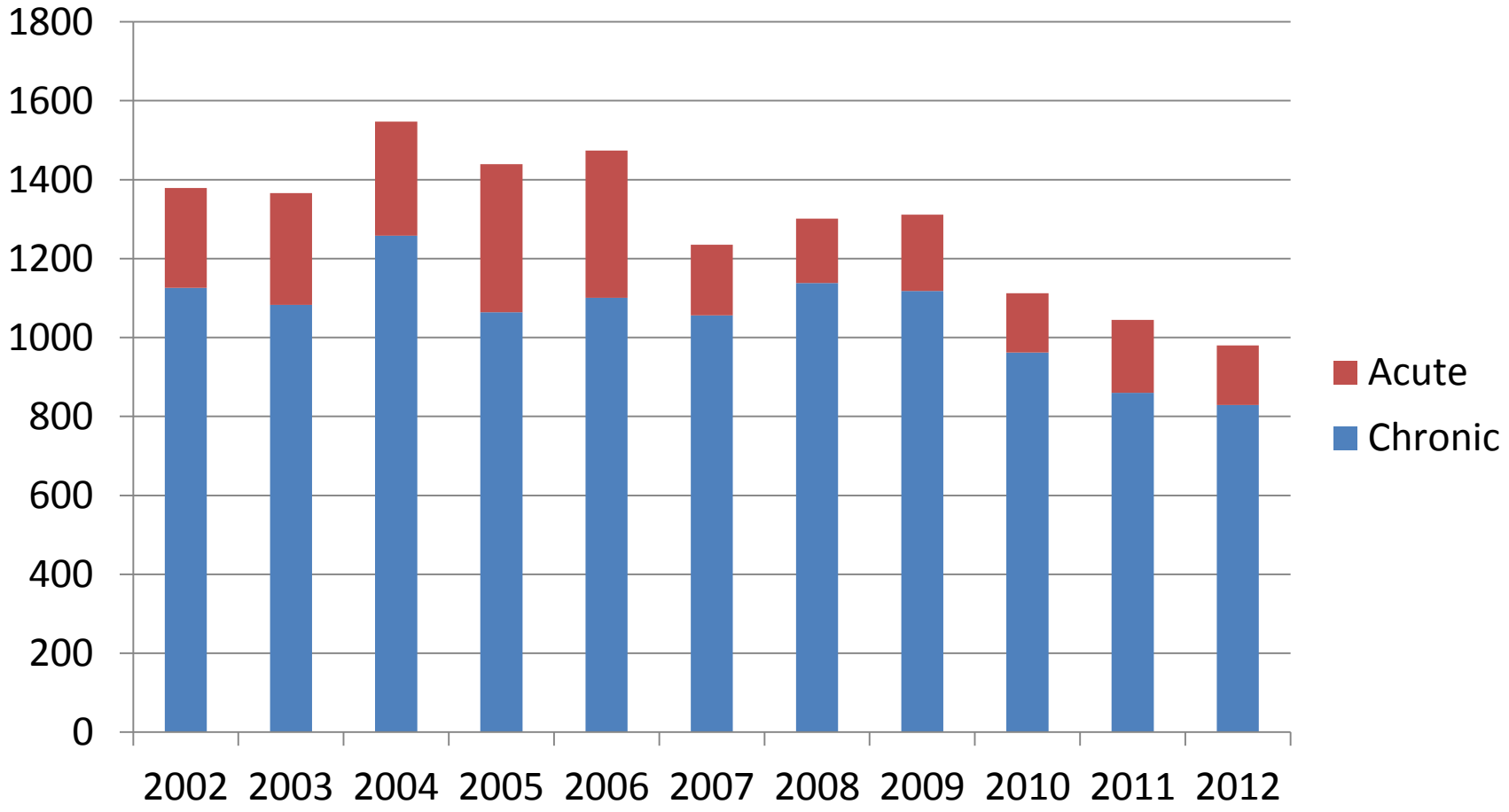
- Three mumps cases in unvaccinated siblings
- Index case IgM positive at the Arizona State Laboratory, parents refused lab testing for the other two sibling cases
- Maricopa County recommended that unimmunized children in the school of the cases be excluded for 26 days from the case's last day of contagion (19 children in the school were unimmunized).
- No further cases identified

# Arizona Confirmed Mumps Cases 2002-2012



# Hepatitis B

# Arizona Reported Hepatitis B Cases 2002-2012



# Perinatal Hepatitis B

- Hepatitis B Vaccine recommended for all infants soon after birth and before hospital discharge
- For mothers that have Hepatitis B, Hepatitis B vaccine and HBIG recommended within 12 hours of birth
- For mothers with unknown status, mother should be tested and infant should receive first dose of vaccine within 12 hours of birth. If mother is positive for Hepatitis B, infant should receive HBIG as soon as possible and no later than 7 days old

# Influenza

# Influenza Surveillance

# Influenza H7N9

# Arizona Infectious Disease Conference
# July 23-25, 2013

- Location: Black Canyon Conference Center, 9440 N. 25th Ave., Phoenix, AZ, 85021
- Topics: VPDs, Healthcare-Associated Infections, Influenza, Refugee Health, Vector-borne and Zoonotic Diseases, TB, HIV, STD, and more
- Cost: Free!
- Disease Outbreak Tabletop Exercise
- Registration available online:
  - https://www.surveymonkey.com/s/2013AZID

# ADHS VPD Surveillance Staff

- Karman Tam, karman.tam@azdhs.gov
- Susan Goodykoontz, goodyks@azdhs.gov
- Eugene Livar, eugene.livar@azdhs.gov
- Shane Brady, shane.brady@azdhs.gov
- Kristin Feelemyer, kristin.feelemyer@azdhs.gov
- Clarisse Tsang, clarisse.tsang@azdhs.gov

602-364-3676

# Questions?

Thank you!